<110> Goodman, Corey
      Kid, Thomas
      Brose, Katja
      Tessier-Lavigne, Marc

<120> Modulating Robo: Ligand Interactions

<130> B98-031-3

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<150> 60/065,544
<151> 1997-11-14

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atg cgc ggc gtt ggc tgg cag atg ctg tcc ctg tcg ctg ggg tta gtg    48
Met Arg Gly Val Gly Trp Gln Met Leu Ser Leu Ser Leu Gly Leu Val
 1               5                  10                  15

ctg gcg atc ctg aac aag gtg gca ccg cag gcg tgc ccg gcg cag tgc    96
Leu Ala Ile Leu Asn Lys Val Ala Pro Gln Ala Cys Pro Ala Gln Cys
            20                  25                  30

tct tgc tcg ggc agc aca gtg gac tgt cac ggg ctg gcg ctg cgc agc   144
Ser Cys Ser Gly Ser Thr Val Asp Cys His Gly Leu Ala Leu Arg Ser
        35                  40                  45

gtg ccc agg aat atc ccc cgc aac acc gag aga ctg gat tta aat gga   192
Val Pro Arg Asn Ile Pro Arg Asn Thr Glu Arg Leu Asp Leu Asn Gly
    50                  55                  60

aat aac atc aca aga att acg aag aca gat ttt gct ggt ctt aga cat   240
Asn Asn Ile Thr Arg Ile Thr Lys Thr Asp Phe Ala Gly Leu Arg His
 65                  70                  75                  80
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cta aga gtt ctt cag ctt atg gag aat aag att agc acc att gaa aga    288
Leu Arg Val Leu Gln Leu Met Glu Asn Lys Ile Ser Thr Ile Glu Arg
                    85                  90                  95

gga gca ttc cag gat ctt aaa gaa cta gag aga ctg cgt tta aac aga    336
Gly Ala Phe Gln Asp Leu Lys Glu Leu Glu Arg Leu Arg Leu Asn Arg
                100                 105                 110

aat cac ctt cag ctg ttt cct gag ttg ctg ttt ctt ggg act gcg aag    384
Asn His Leu Gln Leu Phe Pro Glu Leu Leu Phe Leu Gly Thr Ala Lys
            115                 120                 125

cta tac agg ctt gat ctc agt gaa aac caa att cag gca atc cca agg    432
Leu Tyr Arg Leu Asp Leu Ser Glu Asn Gln Ile Gln Ala Ile Pro Arg
        130                 135                 140

aaa gct ttc cgt ggg gca gtt gac ata aaa aat ttg caa ctg gat tac    480
Lys Ala Phe Arg Gly Ala Val Asp Ile Lys Asn Leu Gln Leu Asp Tyr
145                 150                 155                 160

aac cag atc agc tgt att gaa gat ggg gca ttc agg gct ctc cgg gac    528
Asn Gln Ile Ser Cys Ile Glu Asp Gly Ala Phe Arg Ala Leu Arg Asp
                165                 170                 175

ctg gaa gtg ctc act ctc aac aat aac aac att act aga ctt tct gtg    576
Leu Glu Val Leu Thr Leu Asn Asn Asn Asn Ile Thr Arg Leu Ser Val
            180                 185                 190

gca agt ttc aac cat atg cct aaa ctt agg act ttt cga ctg cat tca    624
Ala Ser Phe Asn His Met Pro Lys Leu Arg Thr Phe Arg Leu His Ser
            195                 200                 205

aac aac ctg tat tgt gac tgc cac ctg gcc tgg ctc tcc gac tgg ctt    672
Asn Asn Leu Tyr Cys Asp Cys His Leu Ala Trp Leu Ser Asp Trp Leu
        210                 215                 220

cgc aaa agg cct cgg gtt ggt ctg tac act cag tgt atg ggc ccc tcc    720
Arg Lys Arg Pro Arg Val Gly Leu Tyr Thr Gln Cys Met Gly Pro Ser
225                 230                 235                 240

cac ctg aga ggc cat aat gta gcc gag gtt caa aaa cga gaa ttt gtc    768
His Leu Arg Gly His Asn Val Ala Glu Val Gln Lys Arg Glu Phe Val
                245                 250                 255

tgc agt gat gag gaa gaa ggt cac cag tca ttt atg gct cct tct tgt    816
Cys Ser Asp Glu Glu Glu Gly His Gln Ser Phe Met Ala Pro Ser Cys
                260                 265                 270

agt gtt ttg cac tgc cct gcc gcc tgt acc tgt agc aac aat atc gta    864
Ser Val Leu His Cys Pro Ala Ala Cys Thr Cys Ser Asn Asn Ile Val
            275                 280                 285

gac tgt cgt ggg aaa ggt ctc act gag atc ccc aca aat ctt cca gag    912
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2   3⁵

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Asp Cys Arg Gly Lys Gly Leu Thr Glu Ile Pro Thr Asn Leu Pro Glu
    290                 295                 300

acc atc aca gaa ata cgt ttg gaa cag aac aca atc aaa gtc atc cct     960
Thr Ile Thr Glu Ile Arg Leu Glu Gln Asn Thr Ile Lys Val Ile Pro
305                 310                 315                 320

cct gga gct ttc tca cca tat aaa aag ctt aga cga att gac ctg agc    1008
Pro Gly Ala Phe Ser Pro Tyr Lys Lys Leu Arg Arg Ile Asp Leu Ser
                325                 330                 335

aat aat cag atc tct gaa ctt gca cca gat gct ttc caa gga cta cgc    1056
Asn Asn Gln Ile Ser Glu Leu Ala Pro Asp Ala Phe Gln Gly Leu Arg
            340                 345                 350

tct ctg aat tca ctt gtc ctc tat gga aat aaa atc aca gaa ctc ccc    1104
Ser Leu Asn Ser Leu Val Leu Tyr Gly Asn Lys Ile Thr Glu Leu Pro
            355                 360                 365

aaa agt tta ttt gaa gga ctg ttt tcc tta cag ctc cta tta ttg aat    1152
Lys Ser Leu Phe Glu Gly Leu Phe Ser Leu Gln Leu Leu Leu Leu Asn
    370                 375                 380

gcc aac aag ata aac tgc ctt cgg gta gat gct ttt cag gat ctc cac    1200
Ala Asn Lys Ile Asn Cys Leu Arg Val Asp Ala Phe Gln Asp Leu His
385                 390                 395                 400

aac ttg aac ctt ctc tcc cta tat gac aac aag ctt cag acc atc gcc    1248
Asn Leu Asn Leu Leu Ser Leu Tyr Asp Asn Lys Leu Gln Thr Ile Ala
                405                 410                 415

aag ggg acc ttt tca cct ctt cgg gcc att caa act atg cat ttg gcc    1296
Lys Gly Thr Phe Ser Pro Leu Arg Ala Ile Gln Thr Met His Leu Ala
                420                 425                 430

cag aac ccc ttt att tgt gac tgc cat ctc aag tgg cta gcg gat tat    1344
Gln Asn Pro Phe Ile Cys Asp Cys His Leu Lys Trp Leu Ala Asp Tyr
            435                 440                 445

ctc cat acc aac ccg att gag acc agt ggt gcc cgt tgc acc agc ccc    1392
Leu His Thr Asn Pro Ile Glu Thr Ser Gly Ala Arg Cys Thr Ser Pro
        450                 455                 460

cgc cgc ctg gca aac aaa aga att gga cag atc aaa agc aag aaa ttc    1440
Arg Arg Leu Ala Asn Lys Arg Ile Gly Gln Ile Lys Ser Lys Lys Phe
465                 470                 475                 480

cgt tgt tca ggt aca gaa gat tat cga tca aaa tta agt gga gac tgc    1488
Arg Cys Ser Gly Thr Glu Asp Tyr Arg Ser Lys Leu Ser Gly Asp Cys
                485                 490                 495

ttt gcg gat ctg gct tgc cct gaa aag tgt cgc tgt gaa gga acc aca    1536
Phe Ala Asp Leu Ala Cys Pro Glu Lys Cys Arg Cys Glu Gly Thr Thr
                500                 505                 510
```

36

3

```
gta gat tgc tct aat caa aag ctc aac aaa atc ccg gag cac att ccc    1584
Val Asp Cys Ser Asn Gln Lys Leu Asn Lys Ile Pro Glu His Ile Pro
        515                 520                 525

cag tac act gca gag ttg cgt ctc aat aat aat gaa ttt acc gtg ttg    1632
Gln Tyr Thr Ala Glu Leu Arg Leu Asn Asn Asn Glu Phe Thr Val Leu
        530                 535                 540

gaa gcc aca gga atc ttt aag aaa ctt cct caa tta cgt aaa ata aac    1680
Glu Ala Thr Gly Ile Phe Lys Lys Leu Pro Gln Leu Arg Lys Ile Asn
545                 550                 555                 560

ttt agc aac aat aag atc aca gat att gag gag gga gca ttt gaa gga    1728
Phe Ser Asn Asn Lys Ile Thr Asp Ile Glu Glu Gly Ala Phe Glu Gly
                565                 570                 575

gca tct ggt gta aat gaa ata ctt ctt acg agt aat cgt ttg gaa aat    1776
Ala Ser Gly Val Asn Glu Ile Leu Leu Thr Ser Asn Arg Leu Glu Asn
                580                 585                 590

gtg cag cat aag atg ttc aag gga ttg gaa agc ctc aaa act ttg atg    1824
Val Gln His Lys Met Phe Lys Gly Leu Glu Ser Leu Lys Thr Leu Met
        595                 600                 605

ttg aga agc aat cga ata acc tgt gtg ggg aat gac agt ttc ata gga    1872
Leu Arg Ser Asn Arg Ile Thr Cys Val Gly Asn Asp Ser Phe Ile Gly
        610                 615                 620

ctc agt tct gtg cgt ttg ctt tct ttg tat gat aat caa att act aca    1920
Leu Ser Ser Val Arg Leu Leu Ser Leu Tyr Asp Asn Gln Ile Thr Thr
625                 630                 635                 640

gtt gca cca ggg gca ttt gat act ctc cat tct tta tct act cta aac    1968
Val Ala Pro Gly Ala Phe Asp Thr Leu His Ser Leu Ser Thr Leu Asn
                645                 650                 655

ctc ttg gcc aat cct ttt aac tgt aac tgc tac ctg gct tgg ttg gga    2016
Leu Leu Ala Asn Pro Phe Asn Cys Asn Cys Tyr Leu Ala Trp Leu Gly
                660                 665                 670

gag tgg ctg aga aag aag aga att gtc acg gga aat cct aga tgt caa    2064
Glu Trp Leu Arg Lys Lys Arg Ile Val Thr Gly Asn Pro Arg Cys Gln
        675                 680                 685

aaa cca tac ttc ctg aaa gaa ata ccc atc cag gat gtg gcc att cag    2112
Lys Pro Tyr Phe Leu Lys Glu Ile Pro Ile Gln Asp Val Ala Ile Gln
        690                 695                 700

gac ttc act tgt gat gac gga aat gat gac aat agt tgc tcc cca ctt    2160
Asp Phe Thr Cys Asp Asp Gly Asn Asp Asp Asn Ser Cys Ser Pro Leu
705                 710                 715                 720

tct cgc tgt cct act gaa tgt act tgc ttg gat aca gtc gtc cga tgt    2208
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```
Ser Arg Cys Pro Thr Glu Cys Thr Cys Leu Asp Thr Val Val Arg Cys
            725                 730                 735

agc aac aag ggt ttg aag gtc ttg ccg aaa ggt att cca aga gat gtc    2256
Ser Asn Lys Gly Leu Lys Val Leu Pro Lys Gly Ile Pro Arg Asp Val
            740                 745                 750

aca gag ttg tat ctg gat gga aac caa ttt aca ctg gtt ccc aag gaa    2304
Thr Glu Leu Tyr Leu Asp Gly Asn Gln Phe Thr Leu Val Pro Lys Glu
            755                 760                 765

ctc tcc aac tac aaa cat tta aca ctt ata gac tta agt aac aac aga    2352
Leu Ser Asn Tyr Lys His Leu Thr Leu Ile Asp Leu Ser Asn Asn Arg
            770                 775                 780

ata agc acg ctt tct aat cag agc ttc agc aac atg acc cag ctc ctc    2400
Ile Ser Thr Leu Ser Asn Gln Ser Phe Ser Asn Met Thr Gln Leu Leu
785                 790                 795                 800

acc tta att ctt agt tac aac cgt ctg aga tgt att cct cct cgc acc    2448
Thr Leu Ile Leu Ser Tyr Asn Arg Leu Arg Cys Ile Pro Pro Arg Thr
                805                 810                 815

ttt gat gga tta aag tct ctt cga tta ctt tct cta cat gga aat gac    2496
Phe Asp Gly Leu Lys Ser Leu Arg Leu Leu Ser Leu His Gly Asn Asp
                820                 825                 830

att tct gtt gtg cct gaa ggt gct ttc aat gat ctt tct gca tta tca    2544
Ile Ser Val Val Pro Glu Gly Ala Phe Asn Asp Leu Ser Ala Leu Ser
                835                 840                 845

cat cta gca att gga gcc aac cct ctt tac tgt gat tgt aac atg cag    2592
His Leu Ala Ile Gly Ala Asn Pro Leu Tyr Cys Asp Cys Asn Met Gln
        850                 855                 860

tgg tta tcc gac tgg gtg aag tcg gaa tat aag gag cct gga att gct    2640
Trp Leu Ser Asp Trp Val Lys Ser Glu Tyr Lys Glu Pro Gly Ile Ala
865                 870                 875                 880

cgt tgt gct ggt cct gga gaa atg gca gat aaa ctt tta ctc aca act    2688
Arg Cys Ala Gly Pro Gly Glu Met Ala Asp Lys Leu Leu Leu Thr Thr
                885                 890                 895

ccc tcc aaa aaa ttt acc tgt caa ggt cct gtg gat gtc aat att cta    2736
Pro Ser Lys Lys Phe Thr Cys Gln Gly Pro Val Asp Val Asn Ile Leu
            900                 905                 910

gct aag tgt aac ccc tgc cta tca aat ccg tgt aaa aat gat ggc aca    2784
Ala Lys Cys Asn Pro Cys Leu Ser Asn Pro Cys Lys Asn Asp Gly Thr
            915                 920                 925

tgt aat agt gat cca gtt gac ttt tac cga tgc acc tgt cca tat ggt    2832
Cys Asn Ser Asp Pro Val Asp Phe Tyr Arg Cys Thr Cys Pro Tyr Gly
    930                 935                 940
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```
ttc aag ggg cag gac tgt gat gtc cca att cat gcc tgc atc agt aac        2880
Phe Lys Gly Gln Asp Cys Asp Val Pro Ile His Ala Cys Ile Ser Asn
945                 950             955                 960

cca tgt aaa cat gga gga act tgc cac tta aag gaa gga gaa gaa gat        2928
Pro Cys Lys His Gly Gly Thr Cys His Leu Lys Glu Gly Glu Glu Asp
                965             970             975

gga ttc tgg tgt att tgt gct gat gga ttt gaa gga gaa aat tgt gaa        2976
Gly Phe Trp Cys Ile Cys Ala Asp Gly Phe Glu Gly Glu Asn Cys Glu
                980             985             990

gtc aac gtt gat gat tgt gaa gat aat gac tgt gaa aat aat tct aca        3024
Val Asn Val Asp Asp Cys Glu Asp Asn Asp Cys Glu Asn Asn Ser Thr
            995             1000            1005

tgt gtc gat ggc att aat aac tac aca tgc ctt tgc cca cct gag tat        3072
Cys Val Asp Gly Ile Asn Asn Tyr Thr Cys Leu Cys Pro Pro Glu Tyr
        1010            1015            1020

aca ggt gag ttg tgt gag gag aag ctg gac ttc tgt gcc cag gac ctg       3120
Thr Gly Glu Leu Cys Glu Glu Lys Leu Asp Phe Cys Ala Gln Asp Leu
1025            1030            1035            1040

aac ccc tgc cag cac gat tca aag tgc atc cta act cca aag gga ttc        3168
Asn Pro Cys Gln His Asp Ser Lys Cys Ile Leu Thr Pro Lys Gly Phe
            1045            1050            1055

aaa tgt gac tgc aca cca ggg tac gta ggt gaa cac tgc gac atc gat       3216
Lys Cys Asp Cys Thr Pro Gly Tyr Val Gly Glu His Cys Asp Ile Asp
            1060            1065            1070

ttt gac gac tgc caa gac aac aag tgt aaa aac gga gcc cac tgc aca        3264
Phe Asp Asp Cys Gln Asp Asn Lys Cys Lys Asn Gly Ala His Cys Thr
        1075            1080            1085

gat gca gtg aac ggc tat acg tgc ata tgc ccc gaa ggt tac agt ggc       3312
Asp Ala Val Asn Gly Tyr Thr Cys Ile Cys Pro Glu Gly Tyr Ser Gly
        1090            1095            1100

ttg ttc tgt gag ttt tct cca ccc atg gtc ctc cct cgt acc agc ccc       3360
Leu Phe Cys Glu Phe Ser Pro Pro Met Val Leu Pro Arg Thr Ser Pro
1105            1110            1115            1120

tgt gat aat ttt gat tgt cag aat gga gct cag tgt atc gtc aga ata       3408
Cys Asp Asn Phe Asp Cys Gln Asn Gly Ala Gln Cys Ile Val Arg Ile
            1125            1130            1135

aat gag cca ata tgt cag tgt ttg cct ggc tat cag gga gaa aag tgt       3456
Asn Glu Pro Ile Cys Gln Cys Leu Pro Gly Tyr Gln Gly Glu Lys Cys
            1140            1145            1150

gaa aaa ttg gtt agt gtg aat ttt ata aac aaa gag tct tat ctt cag       3504
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Glu Lys Leu Val Ser Val Asn Phe Ile Asn Lys Glu Ser Tyr Leu Gln
     1155                1160                1165

att cct tca gcc aag gtt cgg cct cag acg aac ata aca ctt cag att    3552
Ile Pro Ser Ala Lys Val Arg Pro Gln Thr Asn Ile Thr Leu Gln Ile
     1170                1175                1180

gcc aca gat gaa gac agc gga atc ctc ctg tat aag ggt gac aaa gac    3600
Ala Thr Asp Glu Asp Ser Gly Ile Leu Leu Tyr Lys Gly Asp Lys Asp
1185                1190                1195                1200

cat atc gcg gta gaa ctc tat cgg ggg cgt gtt cgt gcc agc tat gac    3648
His Ile Ala Val Glu Leu Tyr Arg Gly Arg Val Arg Ala Ser Tyr Asp
                1205                1210                1215

acc ggc tct cat cca gct tct gcc att tac agt gtg gag aca atc aat    3696
Thr Gly Ser His Pro Ala Ser Ala Ile Tyr Ser Val Glu Thr Ile Asn
               1220                1225                1230

gat gga aac ttc cac att gtg gaa cta ctt gcc ttg gat cag agt ctc    3744
Asp Gly Asn Phe His Ile Val Glu Leu Leu Ala Leu Asp Gln Ser Leu
          1235                1240                1245

tct ttg tcc gtg gat ggt ggg aac ccc aaa atc atc act aac ttg tca    3792
Ser Leu Ser Val Asp Gly Gly Asn Pro Lys Ile Ile Thr Asn Leu Ser
     1250                1255                1260

aag cag tcc act ctg aat ttt gac tct cca ctc tat gta gga ggc atg    3840
Lys Gln Ser Thr Leu Asn Phe Asp Ser Pro Leu Tyr Val Gly Gly Met
1265                1270                1275                1280

cca ggg aag agt aac gtg gca tct ctg cgc cag gcc cct ggg cag aac    3888
Pro Gly Lys Ser Asn Val Ala Ser Leu Arg Gln Ala Pro Gly Gln Asn
                1285                1290                1295

gga acc agc ttc cac ggc tgc atc cgg aac ctt tac atc aac agt gag    3936
Gly Thr Ser Phe His Gly Cys Ile Arg Asn Leu Tyr Ile Asn Ser Glu
               1300                1305                1310

ctg cag gac ttc cag aag gtg ccg atg caa aca ggc att ttg cct ggc    3984
Leu Gln Asp Phe Gln Lys Val Pro Met Gln Thr Gly Ile Leu Pro Gly
          1315                1320                1325

tgt gag cca tgc cac aag aag gtg tgt gcc cat ggc aca tgc cag ccc    4032
Cys Glu Pro Cys His Lys Lys Val Cys Ala His Gly Thr Cys Gln Pro
     1330                1335                1340

agc agc cag gca ggc ttc acc tgc gag tgc cag gaa gga tgg atg ggg    4080
Ser Ser Gln Ala Gly Phe Thr Cys Glu Cys Gln Glu Gly Trp Met Gly
1345                1350                1355                1360

ccc ctc tgt gac caa cgg acc aat gac cct tgc ctt gga aat aaa tgc    4128
Pro Leu Cys Asp Gln Arg Thr Asn Asp Pro Cys Leu Gly Asn Lys Cys
               1365                1370                1375
```

7   44

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gta cat ggc acc tgc ttg ccc atc aat gcg ttc tcc tac agc tgt aag      4176
Val His Gly Thr Cys Leu Pro Ile Asn Ala Phe Ser Tyr Ser Cys Lys
          1380              1385              1390

tgc ttg gag ggc cat gga ggt gtc ctc tgt gat gaa gag gag gat ctg      4224
Cys Leu Glu Gly His Gly Gly Val Leu Cys Asp Glu Glu Glu Asp Leu
          1395              1400              1405

ttt aac cca tgc cag gcg atc aag tgc aag cat ggg aag tgc agg ctt      4272
Phe Asn Pro Cys Gln Ala Ile Lys Cys Lys His Gly Lys Cys Arg Leu
      1410              1415              1420

tca ggt ctg ggg cag ccc tac tgt gaa tgc agc agt gga tac acg ggg      4320
Ser Gly Leu Gly Gln Pro Tyr Cys Glu Cys Ser Ser Gly Tyr Thr Gly
1425              1430              1435              1440

gac agc tgt gat cga gaa atc tct tgt cga ggg gaa agg ata aga gat      4368
Asp Ser Cys Asp Arg Glu Ile Ser Cys Arg Gly Glu Arg Ile Arg Asp
              1445              1450              1455

tat tac caa aag cag cag ggc tat gct gct tgc caa aca acc aag aag      4416
Tyr Tyr Gln Lys Gln Gln Gly Tyr Ala Ala Cys Gln Thr Thr Lys Lys
          1460              1465              1470

gtg tcc cga tta gag tgc aga ggt ggg tgt gca gga ggg cag tgc tgt      4464
Val Ser Arg Leu Glu Cys Arg Gly Gly Cys Ala Gly Gly Gln Cys Cys
          1475              1480              1485

gga ccg ctg agg agc aag cgg cgg aaa tac tct ttc gaa tgc act gac      4512
Gly Pro Leu Arg Ser Lys Arg Arg Lys Tyr Ser Phe Glu Cys Thr Asp
      1490              1495              1500

ggc tcc tcc ttt gtg gac gag gtt gag aaa gtg gtg aag tgc ggc tgt      4560
Gly Ser Ser Phe Val Asp Glu Val Glu Lys Val Val Lys Cys Gly Cys
1505              1510              1515              1520

acg agg tgt gtg tcc taaacacact cccggcagct ctgtctttgg aaaaggttgt      4615
Thr Arg Cys Val Ser
              1525

atacttcttg accatgtggg actaatgaat gcttcatagt ggaaatattt gaaatatatt 4675

gtaaaataca gaacagactt atttttatta tgagaataaa gacttttttt ctgcatttgg 4735

aaaaaaaaaa aaaaaaaact cga                                          4758


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41

8

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Met Arg Gly Val Gly Trp Gln Met Leu Ser Leu Ser Leu Gly Leu Val
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Leu Ala Ile Leu Asn Lys Val Ala Pro Gln Ala Cys Pro Ala Gln Cys
             20                  25                  30

Ser Cys Ser Gly Ser Thr Val Asp Cys His Gly Leu Ala Leu Arg Ser
         35                  40                  45

Val Pro Arg Asn Ile Pro Arg Asn Thr Glu Arg Leu Asp Leu Asn Gly
     50                  55                  60

Asn Asn Ile Thr Arg Ile Thr Lys Thr Asp Phe Ala Gly Leu Arg His
 65                  70                  75                  80

Leu Arg Val Leu Gln Leu Met Glu Asn Lys Ile Ser Thr Ile Glu Arg
             85                  90                  95

Gly Ala Phe Gln Asp Leu Lys Glu Leu Glu Arg Leu Arg Leu Asn Arg
             100                 105                 110

Asn His Leu Gln Leu Phe Pro Glu Leu Leu Phe Leu Gly Thr Ala Lys
         115                 120                 125

Leu Tyr Arg Leu Asp Leu Ser Glu Asn Gln Ile Gln Ala Ile Pro Arg
     130                 135                 140

Lys Ala Phe Arg Gly Ala Val Asp Ile Lys Asn Leu Gln Leu Asp Tyr
145                 150                 155                 160

Asn Gln Ile Ser Cys Ile Glu Asp Gly Ala Phe Arg Ala Leu Arg Asp
             165                 170                 175

Leu Glu Val Leu Thr Leu Asn Asn Asn Asn Ile Thr Arg Leu Ser Val
             180                 185                 190

Ala Ser Phe Asn His Met Pro Lys Leu Arg Thr Phe Arg Leu His Ser
         195                 200                 205

Asn Asn Leu Tyr Cys Asp Cys His Leu Ala Trp Leu Ser Asp Trp Leu
     210                 215                 220

Arg Lys Arg Pro Arg Val Gly Leu Tyr Thr Gln Cys Met Gly Pro Ser
225                 230                 235                 240

His Leu Arg Gly His Asn Val Ala Glu Val Gln Lys Arg Glu Phe Val
             245                 250                 255

Cys Ser Asp Glu Glu Glu Gly His Gln Ser Phe Met Ala Pro Ser Cys
         260                 265                 270

Ser Val Leu His Cys Pro Ala Ala Cys Thr Cys Ser Asn Asn Ile Val
     275                 280                 285
```

42

9

```
Asp Cys Arg Gly Lys Gly Leu Thr Glu Ile Pro Thr Asn Leu Pro Glu
    290             295             300
```

```
Thr Ile Thr Glu Ile Arg Leu Glu Gln Asn Thr Ile Lys Val Ile Pro
305             310             315             320
```

```
Pro Gly Ala Phe Ser Pro Tyr Lys Lys Leu Arg Arg Ile Asp Leu Ser
            325             330             335
```

```
Asn Asn Gln Ile Ser Glu Leu Ala Pro Asp Ala Phe Gln Gly Leu Arg
            340             345             350
```

```
Ser Leu Asn Ser Leu Val Leu Tyr Gly Asn Lys Ile Thr Glu Leu Pro
            355             360             365
```

```
Lys Ser Leu Phe Glu Gly Leu Phe Ser Leu Gln Leu Leu Leu Leu Asn
    370             375             380
```

```
Ala Asn Lys Ile Asn Cys Leu Arg Val Asp Ala Phe Gln Asp Leu His
385             390             395             400
```

```
Asn Leu Asn Leu Leu Ser Leu Tyr Asp Asn Lys Leu Gln Thr Ile Ala
            405             410             415
```

```
Lys Gly Thr Phe Ser Pro Leu Arg Ala Ile Gln Thr Met His Leu Ala
            420             425             430
```

```
Gln Asn Pro Phe Ile Cys Asp Cys His Leu Lys Trp Leu Ala Asp Tyr
            435             440             445
```

```
Leu His Thr Asn Pro Ile Glu Thr Ser Gly Ala Arg Cys Thr Ser Pro
    450             455             460
```

```
Arg Arg Leu Ala Asn Lys Arg Ile Gly Gln Ile Lys Ser Lys Lys Phe
465             470             475             480
```

```
Arg Cys Ser Gly Thr Glu Asp Tyr Arg Ser Lys Leu Ser Gly Asp Cys
            485             490             495
```

```
Phe Ala Asp Leu Ala Cys Pro Glu Lys Cys Arg Cys Glu Gly Thr Thr
            500             505             510
```

```
Val Asp Cys Ser Asn Gln Lys Leu Asn Lys Ile Pro Glu His Ile Pro
            515             520             525
```

```
Gln Tyr Thr Ala Glu Leu Arg Leu Asn Asn Asn Glu Phe Thr Val Leu
    530             535             540
```

```
Glu Ala Thr Gly Ile Phe Lys Lys Leu Pro Gln Leu Arg Lys Ile Asn
545             550             555             560
```

```
Phe Ser Asn Asn Lys Ile Thr Asp Ile Glu Glu Gly Ala Phe Glu Gly
            565             570             575
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43

10

Ala Ser Gly Val Asn Glu Ile Leu Leu Thr Ser Asn Arg Leu Glu Asn
          580   585   590

Val Gln His Lys Met Phe Lys Gly Leu Glu Ser Leu Lys Thr Leu Met
          595   600   605

Leu Arg Ser Asn Arg Ile Thr Cys Val Gly Asn Asp Ser Phe Ile Gly
          610   615   620

Leu Ser Ser Val Arg Leu Leu Ser Leu Tyr Asp Asn Gln Ile Thr Thr
625   630   635   640

Val Ala Pro Gly Ala Phe Asp Thr Leu His Ser Leu Ser Thr Leu Asn
              645   650   655

Leu Leu Ala Asn Pro Phe Asn Cys Asn Cys Tyr Leu Ala Trp Leu Gly
          660   665   670

Glu Trp Leu Arg Lys Lys Arg Ile Val Thr Gly Asn Pro Arg Cys Gln
          675   680   685

Lys Pro Tyr Phe Leu Lys Glu Ile Pro Ile Gln Asp Val Ala Ile Gln
          690   695   700

Asp Phe Thr Cys Asp Asp Gly Asn Asp Asp Asn Ser Cys Ser Pro Leu
705   710   715   720

Ser Arg Cys Pro Thr Glu Cys Thr Cys Leu Asp Thr Val Val Arg Cys
              725   730   735

Ser Asn Lys Gly Leu Lys Val Leu Pro Lys Gly Ile Pro Arg Asp Val
              740   745   750

Thr Glu Leu Tyr Leu Asp Gly Asn Gln Phe Thr Leu Val Pro Lys Glu
          755   760   765

Leu Ser Asn Tyr Lys His Leu Thr Leu Ile Asp Leu Ser Asn Asn Arg
          770   775   780

Ile Ser Thr Leu Ser Asn Gln Ser Phe Ser Asn Met Thr Gln Leu Leu
785   790   795   800

Thr Leu Ile Leu Ser Tyr Asn Arg Leu Arg Cys Ile Pro Pro Arg Thr
              805   810   815

Phe Asp Gly Leu Lys Ser Leu Arg Leu Leu Ser Leu His Gly Asn Asp
          820   825   830

Ile Ser Val Val Pro Glu Gly Ala Phe Asn Asp Leu Ser Ala Leu Ser
          835   840   845

His Leu Ala Ile Gly Ala Asn Pro Leu Tyr Cys Asp Cys Asn Met Gln
          850   855   860

```
Trp Leu Ser Asp Trp Val Lys Ser Glu Tyr Lys Glu Pro Gly Ile Ala
865             870             875             880

Arg Cys Ala Gly Pro Gly Glu Met Ala Asp Lys Leu Leu Leu Thr Thr
            885             890             895

Pro Ser Lys Lys Phe Thr Cys Gln Gly Pro Val Asp Val Asn Ile Leu
        900             905             910

Ala Lys Cys Asn Pro Cys Leu Ser Asn Pro Cys Lys Asn Asp Gly Thr
        915             920             925

Cys Asn Ser Asp Pro Val Asp Phe Tyr Arg Cys Thr Cys Pro Tyr Gly
    930             935             940

Phe Lys Gly Gln Asp Cys Asp Val Pro Ile His Ala Cys Ile Ser Asn
945             950             955             960

Pro Cys Lys His Gly Gly Thr Cys His Leu Lys Glu Gly Glu Glu Asp
            965             970             975

Gly Phe Trp Cys Ile Cys Ala Asp Gly Phe Glu Gly Glu Asn Cys Glu
        980             985             990

Val Asn Val Asp Asp Cys Glu Asp Asn Asp Cys Glu Asn Asn Ser Thr
        995             1000            1005

Cys Val Asp Gly Ile Asn Asn Tyr Thr Cys Leu Cys Pro Pro Glu Tyr
    1010            1015            1020

Thr Gly Glu Leu Cys Glu Glu Lys Leu Asp Phe Cys Ala Gln Asp Leu
1025            1030            1035            1040

Asn Pro Cys Gln His Asp Ser Lys Cys Ile Leu Thr Pro Lys Gly Phe
            1045            1050            1055

Lys Cys Asp Cys Thr Pro Gly Tyr Val Gly Glu His Cys Asp Ile Asp
        1060            1065            1070

Phe Asp Asp Cys Gln Asp Asn Lys Cys Lys Asn Gly Ala His Cys Thr
        1075            1080            1085

Asp Ala Val Asn Gly Tyr Thr Cys Ile Cys Pro Glu Gly Tyr Ser Gly
    1090            1095            1100

Leu Phe Cys Glu Phe Ser Pro Pro Met Val Leu Pro Arg Thr Ser Pro
1105            1110            1115            1120

Cys Asp Asn Phe Asp Cys Gln Asn Gly Ala Gln Cys Ile Val Arg Ile
            1125            1130            1135

Asn Glu Pro Ile Cys Gln Cys Leu Pro Gly Tyr Gln Gly Glu Lys Cys
        1140            1145            1150
```

```
Glu Lys Leu Val Ser Val Asn Phe Ile Asn Lys Glu Ser Tyr Leu Gln
        1155                1160                1165

Ile Pro Ser Ala Lys Val Arg Pro Gln Thr Asn Ile Thr Leu Gln Ile
        1170                1175                1180

Ala Thr Asp Glu Asp Ser Gly Ile Leu Leu Tyr Lys Gly Asp Lys Asp
1185                1190                1195                1200

His Ile Ala Val Glu Leu Tyr Arg Gly Arg Val Arg Ala Ser Tyr Asp
                1205                1210                1215

Thr Gly Ser His Pro Ala Ser Ala Ile Tyr Ser Val Glu Thr Ile Asn
                1220                1225                1230

Asp Gly Asn Phe His Ile Val Glu Leu Leu Ala Leu Asp Gln Ser Leu
            1235                1240                1245

Ser Leu Ser Val Asp Gly Gly Asn Pro Lys Ile Ile Thr Asn Leu Ser
    1250                1255                1260

Lys Gln Ser Thr Leu Asn Phe Asp Ser Pro Leu Tyr Val Gly Gly Met
1265                1270                1275                1280

Pro Gly Lys Ser Asn Val Ala Ser Leu Arg Gln Ala Pro Gly Gln Asn
                1285                1290                1295

Gly Thr Ser Phe His Gly Cys Ile Arg Asn Leu Tyr Ile Asn Ser Glu
            1300                1305                1310

Leu Gln Asp Phe Gln Lys Val Pro Met Gln Thr Gly Ile Leu Pro Gly
        1315                1320                1325

Cys Glu Pro Cys His Lys Lys Val Cys Ala His Gly Thr Cys Gln Pro
    1330                1335                1340

Ser Ser Gln Ala Gly Phe Thr Cys Glu Cys Gln Glu Gly Trp Met Gly
1345                1350                1355                1360

Pro Leu Cys Asp Gln Arg Thr Asn Asp Pro Cys Leu Gly Asn Lys Cys
                1365                1370                1375

Val His Gly Thr Cys Leu Pro Ile Asn Ala Phe Ser Tyr Ser Cys Lys
            1380                1385                1390

Cys Leu Glu Gly His Gly Gly Val Leu Cys Asp Glu Glu Glu Asp Leu
        1395                1400                1405

Phe Asn Pro Cys Gln Ala Ile Lys Cys Lys His Gly Lys Cys Arg Leu
    1410                1415                1420

Ser Gly Leu Gly Gln Pro Tyr Cys Glu Cys Ser Ser Gly Tyr Thr Gly
1425                1430                1435                1440
```

13   46

Asp Ser Cys Asp Arg Glu Ile Ser Cys Arg Gly Glu Arg Ile Arg Asp
          1445   1450   1455

Tyr Tyr Gln Lys Gln Gln Gly Tyr Ala Ala Cys Gln Thr Thr Lys Lys
          1460   1465   1470

Val Ser Arg Leu Glu Cys Arg Gly Gly Cys Ala Gly Gly Gln Cys Cys
          1475   1480   1485

Gly Pro Leu Arg Ser Lys Arg Arg Lys Tyr Ser Phe Glu Cys Thr Asp
      1490   1495   1500

Gly Ser Ser Phe Val Asp Glu Val Glu Lys Val Val Lys Cys Gly Cys
1505   1510   1515   1520

Thr Arg Cys Val Ser
              1525

<210> 3
<211> 105
<212> PRT
<213> human

<400> 3
Ser Pro Cys Thr Cys Ser Asn Asn Ile Val Asp Cys Arg Gly Lys Gly
  1   5   10   15

Leu Met Glu Ile Pro Ala Asn Leu Pro Glu Gly Ile Val Glu Ile Arg
          20   25   30

Leu Glu Gln Asn Ser Ile Lys Ala Ile Pro Ala Gly Ala Phe Thr Gln
          35   40   45

Tyr Lys Lys Leu Lys Arg Ile Asp Ile Ser Lys Asn Gln Ile Ser Asp
      50   55   60

Ile Ala Pro Asp Ala Phe Gln Gly Leu Lys Ser Leu Thr Ser Leu Val
65   70   75   80

Leu Tyr Gly Asn Lys Ile Thr Glu Ile Ala Lys Gly Leu Phe Asp Gly
              85   90   95

Leu Val Ser Leu Gln Leu Leu Leu Leu
          100   105

<210> 4
<211> 138
<212> PRT
<213> human

<400> 4
Glu Gly Ala Phe Asn Gly Ala Ala Ser Val Gln Glu Leu Met Leu Thr

```
       1                 5                    10                   15
   Gly Asn Gln Leu Glu Thr Val His Gly Arg Gly Phe Arg Gly Gly Leu
            20                  25                  30

   Ser Gly Leu Lys Thr Leu Met Leu Arg Ser Asn Leu Ile Gly Cys Val
            35                  40                  45

   Ser Asn Asp Thr Phe Ala Gly Leu Ser Ser Val Arg Leu Leu Ser Leu
        50                  55                  60

   Tyr Asp Asn Arg Ile Thr Thr Ile Thr Pro Gly Ala Phe Thr Thr Leu
   65                  70                  75                      80

   Val Ser Leu Ser Thr Ile Asn Leu Leu Ser Asn Pro Phe Asn Cys Asn
                    85                  90                  95

   Cys His Leu Gly Ala Gly Leu Gly Lys Trp Leu Arg Lys Arg Arg Ile
                100                 105                 110

   Val Ser Gly Asn Pro Arg Cys Gln Lys Pro Phe Phe Leu Lys Glu Ile
                115                 120                 125

   Pro Ile Gln Gly Val Gly His Pro Gly Ile
        130                 135
```

<210> 5
<211> 160
<212> PRT
<213> human

<220>
<221> misc_feature
<222> (121)..(150)
<223> note="Xaa signifies gap in sequence"

<400> 5
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   Trp Pro Arg Cys Glu Cys Met Pro Gly Tyr Ala Gly Asp Asn Cys Ser
     1                 5                   10                  15

   Glu Asn Gln Asp Asp Cys Arg Asp His Arg Cys Gln Asn Gly Ala Gln
            20                  25                  30

   Cys Met Asp Glu Val Asn Ser Tyr Ser Cys Leu Cys Ala Glu Gly Tyr
            35                  40                  45

   Ser Gly Gln Leu Cys Glu Ile Pro Pro His Leu Pro Ala Pro Lys Ser
        50                  55                  60

   Pro Cys Glu Gly Thr Glu Cys Gln Asn Gly Ala Asn Cys Val Asp Gln
   65                  70                  75                      80

   Gly Asn Arg Pro Val Cys Gln Cys Leu Pro Gly Phe Gly Gly Pro Glu
```

```
                    85                    90                    95
Cys Glu Lys Leu Leu Ser Val Asn Phe Val Asp Arg Asp Thr Tyr Leu
            100                   105                   110

Gln Phe Thr Asp Leu Gln Asn Trp Xaa Arg Xaa Asn Ile Thr Leu Gln
            115                   120                   125

Val Phe Thr Ala Glu Asp Asn Gly Ile Leu Leu Tyr Asn Gly Gly Asn
            130                   135                   140

Asp His Ile Ala Val Xaa Leu Tyr Xaa Gly His Val Arg Phe Ser Tyr
145                   150                   155                   160
```

```
<210> 6
<211> 103
<212> PRT
<213> human

<400> 6
Gln Cys His Ile Ser Asp Gln Gly Glu Pro Tyr Cys Leu Cys Gln Pro
  1               5                   10                  15

Gly Phe Ser Gly Glu His Cys Gln Gln Glu Asn Pro Cys Leu Gly Gln
            20                  25                  30

Val Val Arg Glu Val Ile Arg Arg Gln Lys Gly Tyr Ala Ser Cys Ala
            35                  40                  45

Thr Ala Ser Lys Val Pro Ile Met Glu Cys Arg Gly Gly Cys Gly Pro
        50                  55                  60

Gln Cys Cys Gln Pro Thr Arg Ser Lys Arg Arg Lys Tyr Val Phe Gln
 65                 70                  75                  80

Cys Thr Asp Gly Ser Ser Phe Val Glu Glu Val Glu Arg His Leu Glu
                85                  90                  95

Cys Gly Cys Leu Ala Cys Ser
            100
```

```
<210> 7
<211> 1480
<212> PRT
<213> Drosophila melanogaster

<400> 7
Met Ala Ala Pro Ser Arg Thr Thr Leu Met Pro Pro Pro Phe Arg Leu
  1               5                   10                  15

Gln Leu Arg Leu Leu Ile Leu Pro Ile Leu Leu Leu Leu Arg His Asp
```

49
16

```
                   20                      25                      30
Ala Val His Ala Glu Pro Tyr Ser Gly Gly Phe Gly Ser Ser Ala Val
            35                      40                      45

Ser Ser Gly Gly Leu Gly Ser Val Gly Ile His Ile Pro Gly Gly Gly
            50                      55                      60

Val Gly Val Ile Thr Glu Ala Arg Cys Pro Arg Val Cys Ser Cys Thr
 65                      70                      75                      80

Gly Leu Asn Val Asp Cys Ser His Arg Gly Leu Thr Ser Val Pro Arg
                    85                      90                      95

Lys Ile Ser Ala Asp Val Glu Arg Leu Glu Leu Gln Gly Asn Asn Leu
               100                     105                     110

Thr Val Ile Tyr Glu Thr Asp Phe Gln Arg Leu Thr Lys Leu Arg Met
               115                     120                     125

Leu Gln Leu Thr Asp Asn Gln Ile His Thr Ile Glu Arg Asn Ser Phe
       130                     135                     140

Gln Asp Leu Val Ser Leu Glu Arg Leu Asp Ile Ser Asn Asn Val Ile
145                     150                     155                     160

Thr Thr Val Gly Arg Arg Val Phe Lys Gly Ala Gln Ser Leu Arg Ser
                   165                     170                     175

Leu Gln Leu Asp Asn Asn Gln Ile Thr Cys Leu Asp Glu His Ala Phe
               180                     185                     190

Lys Gly Leu Val Glu Leu Glu Ile Leu Thr Leu Asn Asn Asn Asn Leu
           195                     200                     205

Thr Ser Leu Pro His Asn Ile Phe Gly Gly Leu Gly Arg Leu Arg Ala
   210                     215                     220

Leu Arg Leu Ser Asp Asn Pro Phe Ala Cys Asp Cys His Leu Ser Trp
225                     230                     235                     240

Leu Ser Arg Phe Leu Arg Ser Ala Thr Arg Leu Ala Pro Tyr Thr Arg
                   245                     250                     255

Cys Gln Ser Pro Ser Gln Leu Lys Gly Gln Asn Val Ala Asp Leu His
               260                     265                     270

Asp Gln Glu Phe Lys Cys Ser Gly Leu Thr Glu His Ala Pro Met Glu
           275                     280                     285

Cys Gly Ala Glu Asn Ser Cys Pro His Pro Cys Arg Cys Ala Asp Gly
       290                     295                     300

Ile Val Asp Cys Arg Glu Lys Ser Leu Thr Ser Val Pro Val Thr Leu
```

17   50

Pro Asp Asp Thr Thr Asp Val Arg Leu Glu Gln Asn Phe Ile Thr Glu
              325   330   335

Leu Pro Pro Lys Ser Phe Ser Ser Phe Arg Arg Leu Arg Arg Ile Asp
              340   345   350

Leu Ser Asn Asn Asn Ile Ser Arg Ile Ala His Asp Ala Leu Ser Gly
              355   360   365

Leu Lys Gln Leu Thr Thr Leu Val Leu Tyr Gly Asn Lys Ile Lys Asp
              370   375   380

Leu Pro Ser Gly Val Phe Lys Gly Leu Gly Ser Leu Arg Leu Leu Leu
385   390   395   400

Leu Asn Ala Asn Glu Ile Ser Cys Ile Arg Lys Asp Ala Phe Arg Asp
              405   410   415

Leu His Ser Leu Ser Leu Leu Ser Leu Tyr Asp Asn Asn Ile Gln Ser
              420   425   430

Leu Ala Asn Gly Thr Phe Asp Ala Met Lys Ser Met Lys Thr Val His
              435   440   445

Leu Ala Lys Asn Pro Phe Ile Cys Asp Cys Asn Leu Arg Trp Leu Ala
              450   455   460

Asp Tyr Leu His Lys Asn Pro Ile Glu Thr Ser Gly Ala Arg Cys Glu
465   470   475   480

Ser Pro Lys Arg Met His Arg Arg Arg Ile Glu Ser Leu Arg Glu Glu
              485   490   495

Lys Phe Lys Cys Ser Trp Gly Glu Leu Arg Met Lys Leu Ser Gly Glu
              500   505   510

Cys Arg Met Asp Ser Asp Cys Pro Ala Met Cys His Cys Glu Gly Thr
              515   520   525

Thr Val Asp Cys Thr Gly Arg Arg Leu Lys Glu Ile Pro Arg Asp Ile
              530   535   540

Pro Leu His Thr Thr Glu Leu Leu Leu Asn Asp Asn Glu Leu Gly Arg
545   550   555   560

Ile Ser Ser Asp Gly Leu Phe Gly Arg Leu Pro His Leu Val Lys Leu
              565   570   575

Glu Leu Lys Arg Asn Gln Leu Thr Gly Ile Glu Pro Asn Ala Phe Glu
              580   585   590

Gly Ala Ser His Ile Gln Glu Leu Gln Leu Gly Glu Asn Lys Ile Lys

```
                595                    600                    605

Glu Ile Ser Asn Lys Met Phe Leu Gly Leu His Gln Leu Lys Thr Leu
        610                615                620

Asn Leu Tyr Asp Asn Gln Ile Ser Cys Val Met Pro Gly Ser Phe Glu
625                630                635                    640

His Leu Asn Ser Leu Thr Ser Leu Asn Leu Ala Ser Asn Pro Phe Asn
            645                650                655

Cys Asn Cys His Leu Ala Trp Phe Ala Glu Cys Val Arg Lys Lys Ser
            660                665                670

Leu Asn Gly Gly Ala Ala Arg Cys Gly Ala Pro Ser Lys Val Arg Asp
            675                680                685

Val Gln Ile Lys Asp Leu Pro His Ser Glu Phe Lys Cys Ser Ser Glu
    690                695                700

Asn Ser Glu Gly Cys Leu Gly Asp Gly Tyr Cys Pro Pro Ser Cys Thr
705                710                715                    720

Cys Thr Gly Thr Val Val Ala Cys Ser Arg Asn Gln Leu Lys Glu Ile
                725                730                735

Pro Arg Gly Ile Pro Ala Glu Thr Ser Glu Leu Tyr Leu Glu Ser Asn
            740                745                750

Glu Ile Glu Gln Ile His Tyr Glu Arg Ile Arg His Leu Arg Ser Leu
        755                760                765

Thr Arg Leu Asp Leu Ser Asn Asn Gln Ile Thr Ile Leu Ser Asn Tyr
    770                775                780

Thr Phe Ala Asn Leu Thr Lys Leu Ser Thr Leu Ile Ile Ser Tyr Asn
785                790                795                    800

Lys Leu Gln Cys Leu Gln Arg His Ala Leu Ser Gly Leu Asn Asn Leu
            805                810                815

Arg Val Val Ser Leu His Gly Asn Arg Ile Ser Met Leu Pro Glu Gly
            820                825                830

Ser Phe Glu Asp Leu Lys Ser Leu Thr His Ile Ala Leu Gly Ser Asn
        835                840                845

Pro Leu Tyr Cys Asp Cys Gly Leu Lys Trp Phe Ser Asp Trp Ile Lys
        850                855                860

Leu Asp Tyr Val Glu Pro Gly Ile Ala Arg Cys Ala Glu Pro Glu Gln
865                870                875                    880

Met Lys Asp Lys Leu Ile Leu Ser Thr Pro Ser Ser Ser Phe Val Cys
```

Arg Gly Arg Val Arg Asn Asp Ile Leu Ala Lys Cys Asn Ala Cys Phe
900 905 910

Glu Gln Pro Cys Gln Asn Gln Ala Gln Cys Val Ala Leu Pro Gln Arg
915 920 925

Glu Tyr Gln Cys Leu Cys Gln Pro Gly Tyr His Gly Lys His Cys Glu
930 935 940

Phe Met Ile Asp Ala Cys Tyr Gly Asn Pro Cys Arg Asn Asn Ala Thr
945 950 955 960

Cys Thr Val Leu Glu Glu Gly Arg Phe Ser Cys Gln Cys Ala Pro Gly
965 970 975

Tyr Thr Gly Ala Arg Cys Glu Thr Asn Ile Asp Asp Cys Leu Gly Glu
980 985 990

Ile Lys Cys Gln Asn Asn Ala Thr Cys Ile Asp Gly Val Glu Ser Tyr
995 1000 1005

Lys Cys Glu Cys Gln Pro Gly Phe Ser Gly Glu Phe Cys Asp Thr Lys
1010 1015 1020

Ile Gln Phe Cys Ser Pro Glu Phe Asn Pro Cys Ala Asn Gly Ala Lys
1025 1030 1035 1040

Cys Met Asp His Phe Thr His Tyr Ser Cys Asp Cys Gln Ala Gly Phe
1045 1050 1055

His Gly Thr Asn Cys Thr Asp Asn Ile Asp Asp Cys Gln Asn His Met
1060 1065 1070

Cys Gln Asn Gly Gly Thr Cys Val Asp Gly Ile Asn Asp Tyr Gln Cys
1075 1080 1085

Arg Cys Pro Asp Asp Tyr Thr Gly Lys Tyr Cys Glu Gly His Asn Met
1090 1095 1100

Ile Ser Met Met Tyr Pro Gln Thr Ser Pro Cys Gln Asn His Glu Cys
1105 1110 1115 1120

Lys His Gly Val Cys Phe Gln Pro Asn Ala Gln Gly Ser Asp Tyr Leu
1125 1130 1135

Cys Arg Cys His Pro Gly Tyr Thr Gly Lys Trp Cys Glu Tyr Leu Thr
1140 1145 1150

Ser Ile Ser Phe Val His Asn Asn Ser Phe Val Glu Leu Glu Pro Leu
1155 1160 1165

Arg Thr Arg Pro Glu Ala Asn Val Thr Ile Val Phe Ser Ser Ala Glu

Gln Asn Gly Ile Leu Met Tyr Asp Gly Gln Asp Ala His Leu Ala Val
1185   1190   1195   1200

Glu Leu Phe Asn Gly Arg Ile Arg Val Ser Tyr Asp Val Gly Asn His
               1205   1210   1215

Pro Val Ser Thr Met Tyr Ser Phe Glu Met Val Ala Asp Gly Lys Tyr
               1220   1225   1230

His Ala Val Glu Leu Leu Ala Ile Lys Lys Asn Phe Thr Leu Arg Val
          1235   1240   1245

Asp Arg Gly Leu Ala Arg Ser Ile Ile Asn Glu Gly Ser Asn Asp Tyr
          1250   1255   1260

Leu Lys Leu Thr Thr Pro Met Phe Leu Gly Gly Leu Pro Val Asp Pro
1265   1270   1275   1280

Ala Gln Gln Ala Tyr Lys Asn Trp Gln Ile Arg Asn Leu Thr Ser Phe
               1285   1290   1295

Lys Gly Cys Met Lys Glu Val Trp Ile Asn His Lys Leu Val Asp Phe
               1300   1305   1310

Gly Asn Ala Gln Arg Gln Gln Lys Ile Thr Pro Gly Cys Ala Leu Leu
          1315   1320   1325

Glu Gly Glu Gln Gln Glu Glu Glu Asp Asp Glu Gln Asp Phe Met Asp
     1330   1335   1340

Glu Thr Pro His Ile Lys Glu Glu Pro Val Asp Pro Cys Leu Glu Asn
1345   1350   1355   1360

Lys Cys Arg Arg Gly Ser Arg Cys Val Pro Asn Ser Asn Ala Arg Asp
               1365   1370   1375

Gly Tyr Gln Cys Lys Cys Lys His Gly Gln Arg Gly Arg Tyr Cys Asp
          1380   1385   1390

Gln Gly Glu Gly Ser Thr Glu Pro Pro Thr Val Thr Ala Ala Ser Thr
          1395   1400   1405

Cys Arg Lys Glu Gln Val Arg Glu Tyr Tyr Thr Glu Asn Asp Cys Arg
     1410   1415   1420

Ser Arg Gln Pro Leu Lys Tyr Ala Lys Cys Val Gly Gly Cys Gly Asn
1425   1430   1435   1440

Gln Cys Cys Ala Ala Lys Ile Val Arg Arg Arg Lys Val Arg Met Val
               1445   1450   1455

Cys Ser Asn Asn Arg Lys Tyr Ile Lys Asn Leu Asp Ile Val Arg Lys

```
Cys Gly Cys Thr Lys Lys Cys Tyr
        1475              1480
```

<210> 8
<211> 155
<212> PRT
<213> Caenorhabditis elegans

<220>
<221> misc_feature
<222> (4)..(152)
<223> note="Xaa signifies gap in sequence"

<400> 8
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Arg Asn Pro Xaa Ile Cys Asp Cys Asn Leu Gln Trp Leu Ala Gln Ile
 1               5                   10                  15

Asn Leu Gln Lys Asn Ile Glu Thr Ser Gly Ala Arg Cys Glu Gln Pro
            20                  25                  30

Lys Arg Leu Arg Lys Lys Lys Phe Ala Thr Leu Pro Pro Asn Lys Phe
            35                  40                  45

Lys Cys Lys Gly Ser Glu Ser Phe Val Ser Met Tyr Ala Asp Ser Cys
        50                  55                  60

Phe Ile Asp Ser Ile Cys Pro Thr Gln Cys Asp Cys Tyr Gly Thr Thr
65                  70                  75                  80

Val Asp Cys Asn Lys Arg Gly Leu Asn Thr Ile Pro Thr Ser Ile Pro
                85                  90                  95

Arg Phe Ala Thr Gln Leu Leu Leu Ser Gly Asn Asn Ile Ser Thr Val
            100                 105                 110

Asp Leu Asn Ser Asn Ile His Val Leu Glu Asn Leu Glu Xaa Leu Asp
            115                 120                 125

Leu Ser Asn Asn His Ile Thr Phe Ile Asn Asp Lys Ser Phe Glu Lys
            130                 135                 140

Leu Ser Lys Leu Arg Glu Leu Xaa Leu Asn Asp
145                 150                 155
```

<210> 9
<211> 735
<212> PRT
<213> Caenorhabditis elegans

<400> 9

Ser Asn Lys Asn Leu Thr Ser Phe Pro Ser Arg Ile Pro Phe Asp Thr
1   5   10   15

Thr Glu Leu Tyr Leu Asp Ala Asn Tyr Ile Asn Glu Ile Pro Ala His
            20   25   30

Asp Leu Asn Arg Leu Tyr Ser Leu Thr Lys Leu Asp Leu Ser His Asn
        35   40   45

Arg Leu Ile Ser Leu Glu Asn Asn Thr Phe Ser Asn Leu Thr Arg Leu
    50   55   60

Ser Thr Leu Ile Ile Ser Tyr Asn Lys Leu Arg Cys Leu Gln Pro Leu
65   70   75   80

Ala Phe Asn Gly Leu Asn Ala Leu Arg Ile Leu Ser Leu His Gly Asn
            85   90   95

Asp Ile Ser Phe Leu Pro Gln Ser Ala Phe Ser Asn Leu Thr Ser Ile
            100   105   110

Thr His Ile Ala Val Gly Ser Asn Ser Leu Tyr Cys Asp Cys Asn Met
        115   120   125

Ala Trp Phe Ser Lys Trp Ile Lys Ser Lys Phe Ile Glu Ala Gly Ile
    130   135   140

Ala Arg Cys Glu Tyr Pro Asn Thr Val Ser Asn Gln Leu Leu Leu Thr
145   150   155   160

Ala Gln Pro Tyr Gln Phe Thr Cys Asp Ser Lys Val Pro Thr Lys Leu
            165   170   175

Ala Thr Lys Cys Asp Leu Cys Leu Asn Ser Pro Cys Lys Asn Asn Ala
            180   185   190

Ile Cys Glu Thr Thr Ser Ser Arg Lys Tyr Thr Cys Asn Cys Thr Pro
        195   200   205

Gly Phe Tyr Gly Val His Cys Glu Asn Gln Ile Asp Ala Cys Tyr Gly
    210   215   220

Ser Pro Cys Leu Asn Asn Ala Thr Cys Lys Val Ala Gln Ala Gly Arg
225   230   235   240

Phe Asn Cys Tyr Cys Asn Lys Gly Phe Glu Gly Asp Tyr Cys Glu Lys
            245   250   255

Asn Ile Asp Asp Cys Val Asn Ser Lys Cys Glu Asn Gly Gly Lys Cys
            260   265   270

Val Asp Leu Val Arg Phe Cys Ser Glu Glu Leu Lys Asn Phe Gln Ser
        275   280   285

23   56

```
Phe Gln Ile Asn Ser Tyr Arg Cys Asp Cys Pro Met Glu Tyr Glu Gly
    290                 295             300

Lys His Cys Glu Asp Lys Leu Glu Tyr Cys Thr Lys Lys Leu Asn Pro
305                 310             315                 320

Cys Glu Asn Asn Gly Lys Cys Ile Pro Ile Asn Gly Ser Tyr Ser Cys
                325             330                 335

Met Cys Ser Pro Gly Phe Thr Gly Asn Asn Cys Glu Thr Asn Ile Asp
            340             345             350

Asp Cys Lys Asn Val Glu Cys Gln Asn Gly Gly Ser Cys Val Asp Gly
            355             360             365

Ile Leu Ser Tyr Asp Cys Leu Cys Arg Pro Gly Tyr Ala Gly Gln Tyr
    370             375             380

Cys Glu Ile Pro Pro Met Met Asp Met Glu Tyr Gln Lys Thr Asp Ala
385             390             395                 400

Cys Gln Gln Ser Ala Cys Gly Gln Gly Glu Cys Val Ala Ser Gln Asn
            405             410             415

Ser Ser Asp Phe Thr Cys Lys Cys His Glu Gly Phe Ser Gly Pro Ser
            420             425             430

Cys Asp Arg Gln Met Ser Val Gly Phe Lys Asn Pro Gly Ala Tyr Leu
            435             440             445

Ala Leu Asp Pro Leu Ala Ser Asp Gly Thr Ile Thr Met Thr Leu Arg
    450             455             460

Thr Thr Ser Lys Ile Gly Ile Leu Leu Tyr Tyr Gly Asp Asp His Phe
465             470             475                 480

Val Ser Ala Glu Leu Tyr Asp Gly Arg Val Lys Leu Val Tyr Tyr Ile
            485             490             495

Gly Asn Phe Pro Ala Ser His Met Tyr Ser Ser Val Lys Val Asn Asp
            500             505             510

Gly Leu Pro His Arg Ile Ser Ile Arg Thr Ser Glu Arg Lys Cys Phe
            515             520             525

Leu Gln Ile Asp Lys Asn Pro Val Gln Ile Val Glu Asn Ser Gly Lys
    530             535             540

Ser Asp Gln Leu Ile Thr Lys Gly Lys Glu Met Leu Tyr Ile Gly Gly
545             550             555                 560

Leu Pro Ile Glu Lys Ser Gln Asp Ala Lys Arg Arg Phe His Val Lys
            565             570             575
```

```
Asn Ser Glu Ser Leu Lys Gly Cys Ile Ser Ser Ile Thr Ile Asn Glu
            580             585             590

Val Pro Ile Asn Leu Gln Gln Ala Leu Glu Asn Val Asn Thr Glu Gln
            595             600             605

Ser Cys Ser Ala Thr Val Asn Phe Cys Ala Gly Ile Asp Cys Gly Asn
    610             615             620

Gly Lys Cys Thr Asn Asn Ala Leu Ser Pro Lys Gly Tyr Met Cys Gln
625             630             635             640

Cys Asp Ser His Phe Ser Gly Glu His Cys Asp Glu Lys Arg Ile Lys
            645             650             655

Cys Asp Lys Gln Lys Phe Arg Arg His His Ile Glu Asn Glu Cys Arg
            660             665             670

Ser Val Asp Arg Ile Lys Ile Ala Glu Cys Asn Gly Tyr Cys Gly Gly
            675             680             685

Glu Gln Asn Cys Cys Thr Ala Val Lys Lys Lys Gln Arg Lys Val Lys
    690             695             700

Met Ile Cys Lys Asn Gly Thr Thr Lys Ile Ser Thr Val His Ile Ile
705             710             715             720

Arg Gln Cys Gln Cys Glu Pro Thr Lys Ser Val Leu Ser Glu Lys
            725             730             735


<210> 10
<211> 154
<212> PRT
<213> mouse

<400> 10
Asp Pro Leu Pro Val His His Arg Cys Glu Cys Met Leu Gly Tyr Thr
 1           5               10              15

Gly Asp Asn Cys Ser Glu Asn Gln Asp Asp Cys Lys Asp His Lys Cys
            20              25              30

Gln Asn Gly Ala Gln Cys Val Asp Glu Val Asn Ser Tyr Ala Cys Leu
        35              40              45

Cys Val Glu Gly Tyr Ser Gly Gln Leu Cys Glu Ile Pro Pro Ala Pro
    50              55              60

Arg Ser Ser Cys Glu Gly Thr Glu Cys Gln Asn Gly Ala Asn Cys Val
65              70              75              80

Asp Gln Gly Ser Arg Pro Val Cys Gln Cys Leu Pro Gly Phe Gly Gly
            85              90              95
```

```
Pro Glu Cys Glu Lys Leu Leu Ser Val Asn Phe Val Asp Arg Asp Thr
            100                 105                 110

Tyr Leu Gln Phe Thr Asp Leu Gln Asn Trp Pro Arg Ala Asn Ile Thr
            115                 120                 125

Leu Gln Val Ser Thr Ala Glu Asp Asn Gly Ile Leu Leu Tyr Asn Gly
        130                 135                 140

Asp Asn Asp His Ile Ala Val Glu Leu Tyr
145                 150


<210> 11
<211> 110
<212> PRT
<213> mouse


<400> 11
Ala Phe Lys Cys His His Gly Gln Cys His Ile Ser Asp Arg Gly Glu
    1               5                   10                  15

Pro Tyr Cys Leu Cys Gln Pro Gly Phe Ser Gly His His Cys Glu Gln
                20                  25                  30

Glu Asn Pro Cys Met Gly Glu Ile Val Arg Glu Ala Ile Arg Arg Gln
            35                  40                  45

Lys Asp Tyr Ala Ser Cys Ala Thr Ala Ser Lys Val Pro Ile Met Glu
        50                  55                  60

Cys Arg Gly Gly Cys Gly Thr Thr Cys Cys Gln Pro Ile Arg Ser Lys
    65                  70                  75                  80

Arg Arg Lys Tyr Val Phe Gln Cys Thr Asp Gly Ser Ser Phe Val Glu
                85                  90                  95

Glu Val Glu Arg His Leu Glu Cys Gly Cys Arg Ala Cys Ser
            100                 105                 110


<210> 12
<211> 134
<212> PRT
<213> mouse


<400> 12
His Leu Arg Val Leu Gln Leu Met Glu Asn Arg Ile Ser Thr Ile Glu
    1               5                   10                  15

Arg Gly Ala Phe Gln Asp Leu Lys Glu Leu Glu Arg Leu Arg Leu Asn
                20                  25                  30
```

```
Arg Asn Asn Leu Gln Leu Phe Pro Glu Leu Leu Phe Leu Gly Thr Ala
        35                  40                  45

Arg Leu Tyr Arg Leu Asp Leu Ser Glu Asn Gln Ile Gln Ala Ile Pro
    50                  55                  60

Arg Lys Ala Phe Arg Gly Ala Val Asp Ile Lys Asn Leu Gln Leu Asp
65                  70                  75                  80

Tyr Asn Gln Ile Ser Cys Ile Glu Asp Gly Ala Phe Arg Ala Leu Arg
                85                  90                  95

Asp Leu Glu Val Leu Thr Leu Asn Asn Asn Ile Thr Arg Leu Ser
            100                 105                 110

Val Ala Ser Phe Asn His Met Pro Lys Leu Arg Thr Phe Arg Leu His
        115                 120                 125

Ser Asn Asn Leu Tyr Cys
    130


<210> 13
<211> 104
<212> PRT
<213> mouse

<400> 13
Asn Asn Asp Asp Cys Val Gly His Lys Cys Arg His Gly Ala Gln Cys
 1               5                   10                  15

Val Asp Glu Val Asn Gly Tyr Thr Cys Ile Cys Pro Gln Gly Phe Ser
            20                  25                  30

Gly Leu Phe Cys Glu His Pro Pro Pro Met Val Leu Leu Gln Thr Ser
        35                  40                  45

Pro Cys Asp Gln Tyr Glu Cys Gln Asn Gly Ala Gln Cys Ile Val Val
    50                  55                  60

Gln Gln Glu Pro Thr Cys Arg Cys Pro Pro Gly Phe Ala Gly Pro Arg
65                  70                  75                  80

Cys Glu Lys Leu Ile Thr Val Asn Phe Val Gly Lys Asp Ser Tyr Val
                85                  90                  95

Glu Leu Ala Ser Ala Lys Val Arg
            100


<210> 14
<211> 243
<212> PRT
<213> mouse
```

<400> 14

```
Ile Leu Asp Val Ala Ser Leu Arg Gln Ala Pro Gly Glu Asn Gly Thr
1               5                   10                  15

Ser Phe His Gly Cys Ile Arg Asn Leu Tyr Ile Asn Ser Glu Leu Gln
                20                  25                  30

Asp Phe Arg Lys Met Pro Met Gln Thr Gly Ile Leu Pro Gly Cys Glu
            35                  40                  45

Pro Cys His Lys Lys Val Cys Ala His Gly Cys Cys Gln Pro Ser Ser
        50                  55                  60

Gln Ser Gly Phe Thr Cys Glu Cys Glu Glu Gly Trp Met Gly Pro Leu
65                  70                  75                  80

Cys Asp Gln Arg Thr Asn Asp Pro Cys Leu Gly Asn Lys Cys Val His
                85                  90                  95

Gly Thr Cys Leu Pro Ile Asn Ala Phe Ser Tyr Ser Cys Lys Cys Leu
                100                 105                 110

Glu Gly His Gly Gly Val Leu Cys Asp Glu Glu Glu Asp Leu Phe Asn
            115                 120                 125

Pro Cys Gln Met Ile Lys Cys Lys His Gly Lys Cys Arg Leu Ser Gly
        130                 135                 140

Val Gly Gln Pro Tyr Cys Glu Cys Asn Ser Gly Phe Thr Gly Asp Ser
145                 150                 155                 160

Cys Asp Arg Glu Ile Ser Cys Arg Gly Glu Arg Ile Arg Asp Tyr Tyr
                165                 170                 175

Gln Lys Gln Gln Gly Tyr Ala Ala Cys Gln Thr Thr Lys Lys Val Ser
            180                 185                 190

Arg Leu Glu Cys Arg Gly Gly Cys Ala Gly Gly Gln Cys Cys Gly Pro
            195                 200                 205

Leu Arg Ser Lys Arg Arg Lys Tyr Ser Phe Glu Cys Thr Asp Gly Ser
        210                 215                 220

Ser Phe Val Asp Glu Val Glu Lys Val Val Lys Cys Gly Cys Ala Arg
225                 230                 235                 240

Cys Ala Ser
```

<210> 15
<211> 1395
<212> PRT
<213> Drosophila melanogaster

<400> 15

```
Met His Pro Met His Pro Glu Asn His Ala Ile Ala Arg Ser Thr Ser
1               5                   10                  15
Thr Thr Asn Asn Pro Ser Arg Ser Arg Ser Ser Arg Met Trp Leu Leu
            20                  25                  30
Pro Ala Trp Leu Leu Leu Val Leu Val Ala Ser Asn Gly Leu Pro Ala
        35                  40                  45
Val Arg Gly Gln Tyr Gln Ser Pro Arg Ile Ile Glu His Pro Thr Asp
    50                  55                  60
Leu Val Val Lys Lys Asn Glu Pro Ala Thr Leu Asn Cys Lys Val Glu
65                  70                  75                  80
Gly Lys Pro Glu Pro Thr Ile Glu Trp Phe Lys Asp Gly Glu Pro Val
            85                  90                  95
Ser Thr Asn Glu Lys Lys Ser His Arg Val Gln Phe Lys Asp Gly Ala
            100                 105                 110
Leu Phe Phe Tyr Arg Thr Met Gln Gly Lys Lys Glu Gln Asp Gly Gly
        115                 120                 125
Glu Tyr Trp Cys Val Ala Lys Asn Arg Val Gly Gln Ala Val Ser Arg
        130                 135                 140
His Ala Ser Leu Gln Ile Ala Val Leu Arg Asp Asp Phe Arg Val Glu
145                 150                 155                 160
Pro Lys Asp Thr Arg Val Ala Lys Gly Glu Thr Ala Leu Leu Glu Cys
            165                 170                 175
Gly Pro Pro Lys Gly Ile Pro Glu Pro Thr Leu Ile Trp Ile Lys Asp
            180                 185                 190
Gly Val Pro Leu Asp Asp Leu Lys Ala Met Ser Phe Gly Ala Ser Ser
            195                 200                 205
Arg Val Arg Ile Val Asp Gly Gly Asn Leu Leu Ile Ser Asn Val Glu
    210                 215                 220
Pro Ile Asp Glu Gly Asn Tyr Lys Cys Ile Ala Gln Asn Leu Val Gly
225                 230                 235                 240
Thr Arg Glu Ser Ser Tyr Ala Lys Leu Ile Val Gln Val Lys Pro Tyr
            245                 250                 255
Phe Met Lys Glu Pro Lys Asp Gln Val Met Leu Tyr Gly Gln Thr Ala
            260                 265                 270
Thr Phe His Cys Ser Val Gly Gly Asp Pro Pro Pro Lys Val Leu Trp
        275                 280                 285
Lys Lys Glu Glu Gly Asn Ile Pro Val Ser Arg Ala Arg Ile Leu His
    290                 295                 300
Asp Glu Lys Ser Leu Glu Ile Ser Asn Ile Thr Pro Thr Asp Glu Gly
305                 310                 315                 320
Thr Tyr Val Cys Glu Ala His Asn Asn Val Gly Gln Ile Ser Ala Arg
            325                 330                 335
Ala Ser Leu Ile Val His Ala Pro Pro Asn Phe Thr Lys Arg Pro Ser
        340                 345                 350
Asn Lys Lys Val Gly Leu Asn Gly Val Val Gln Leu Pro Cys Met Ala
        355                 360                 365
Ser Gly Asn Pro Pro Pro Ser Val Phe Trp Thr Lys Glu Gly Val Ser
        370                 375                 380
Thr Leu Met Phe Pro Asn Ser Ser His Gly Arg Gln Tyr Val Ala Ala
385                 390                 395                 400
Asp Gly Thr Leu Gln Ile Thr Asp Val Arg Gln Glu Asp Glu Gly Tyr
            405                 410                 415
```

```
Tyr Val Cys Ser Ala Phe Ser Val Val Asp Ser Ser Thr Val Arg Val
        420                 425                 430
Phe Leu Gln Val Ser Ser Val Asp Glu Arg Pro Pro Pro Ile Ile Gln
        435                 440                 445
Ile Gly Pro Ala Asn Gln Thr Leu Pro Lys Gly Ser Val Ala Thr Leu
        450                 455                 460
Pro Cys Arg Ala Thr Gly Asn Pro Ser Pro Arg Ile Lys Trp Phe His
465                 470                 475                 480
Asp Gly His Ala Val Gln Ala Gly Asn Arg Tyr Ser Ile Ile Gln Gly
                485                 490                 495
Ser Ser Leu Arg Val Asp Asp Leu Gln Leu Ser Asp Ser Gly Thr Tyr
                500                 505                 510
Thr Cys Thr Ala Ser Gly Glu Arg Gly Glu Thr Ser Trp Ala Ala Thr
        515                 520                 525
Leu Thr Val Glu Lys Pro Gly Ser Thr Ser Leu His Arg Ala Ala Asp
        530                 535                 540
Pro Ser Thr Tyr Pro Ala Pro Pro Gly Thr Pro Lys Val Leu Asn Val
545                 550                 555                 560
Ser Arg Thr Ser Ile Ser Leu Arg Trp Ala Lys Ser Gln Glu Lys Pro
                565                 570                 575
Gly Ala Val Gly Pro Ile Ile Gly Tyr Thr Val Glu Tyr Phe Ser Pro
                580                 585                 590
Asp Leu Gln Thr Gly Trp Ile Val Ala Ala His Arg Val Gly Asp Thr
        595                 600                 605
Gln Val Thr Ile Ser Gly Leu Thr Pro Gly Thr Ser Tyr Val Phe Leu
        610                 615                 620
Val Arg Ala Glu Asn Thr Gln Gly Ile Ser Val Pro Ser Gly Leu Ser
625                 630                 635                 640
Asn Val Ile Lys Thr Ile Glu Ala Asp Phe Asp Ala Ala Ser Ala Asn
                645                 650                 655
Asp Leu Ser Ala Ala Arg Thr Leu Leu Thr Gly Lys Ser Val Glu Leu
        660                 665                 670
Ile Asp Ala Ser Ala Ile Asn Ala Ser Ala Val Arg Leu Glu Trp Met
        675                 680                 685
Leu His Val Ser Ala Asp Glu Lys Tyr Val Glu Gly Leu Arg Ile His
        690                 695                 700
Tyr Lys Asp Ala Ser Val Pro Ser Ala Gln Tyr His Ser Ile Thr Val
705                 710                 715                 720
Met Asp Ala Ser Ala Glu Ser Phe Val Val Gly Asn Leu Lys Lys Tyr
                725                 730                 735
Thr Lys Tyr Glu Phe Phe Leu Thr Pro Phe Phe Glu Thr Ile Glu Gly
        740                 745                 750
Gln Pro Ser Asn Ser Lys Thr Ala Leu Thr Tyr Glu Asp Val Pro Ser
        755                 760                 765
Ala Pro Pro Asp Asn Ile Gln Ile Gly Met Tyr Asn Gln Thr Ala Gly
        770                 775               .  780
Trp Val Arg Trp Thr Pro Pro Ser Gln His His Asn Gly Asn Leu
785                 790                 795                 800
Tyr Gly Tyr Lys Ile Glu Val Ser Ala Gly Asn Thr Met Lys Val Leu
                805                 810                 815
Ala Asn Met Thr Leu Asn Ala Thr Thr Thr Ser Val Leu Leu Asn Asn
                820                 825                 830
Leu Thr Thr Gly Ala Val Tyr Ser Val Arg Leu Asn Ser Phe Thr Lys
        835                 840                 845
```

```
Ala Gly Asp Gly Pro Tyr Ser Lys Pro Ile Ser Leu Phe Met Asp Pro
    850                     855             860
Thr His His Val His Pro Pro Arg Ala His Pro Ser Gly Thr His Asp
865                     870             875             880
Gly Arg His Glu Gly Gln Asp Leu Thr Tyr His Asn Asn Gly Asn Ile
            885             890                 895
Pro Pro Gly Asp Ile Asn Pro Thr Thr His Lys Lys Thr Thr Asp Tyr
            900             905             910
Leu Ser Gly Pro Trp Leu Met Val Leu Val Cys Ile Val Leu Leu Val
            915             920             925
Leu Val Ile Ser Ala Ala Ile Ser Met Val Tyr Phe Lys Arg Lys His
    930             935             940
Gln Met Thr Lys Glu Leu Gly His Leu Ser Val Val Ser Asp Asn Glu
945             950             955                 960
Ile Thr Ala Leu Asn Ile Asn Ser Lys Glu Ser Leu Trp Ile Asp His
            965             970                 975
His Arg Gly Trp Arg Thr Ala Asp Thr Asp Lys Asp Ser Gly Leu Ser
            980             985             990
Glu Ser Lys Leu Leu Ser His Val Asn Ser Ser Gln Ser Asn Tyr Asn
            995             1000            1005
Asn Ser Asp Gly Gly Thr Asp Tyr Ala Glu Val Asp Thr Arg Asn Leu
    1010            1015            1020
Thr Thr Phe Tyr Asn Cys Arg Lys Ser Pro Asp Asn Pro Thr Pro Tyr
1025            1030            1035            1040
Ala Thr Thr Met Ile Ile Gly Thr Ser Ser Ser Glu Thr Cys Thr Lys
            1045            1050            1055
Thr Thr Ser Ile Ser Ala Asp Lys Asp Ser Gly Thr His Ser Pro Tyr
            1060            1065            1070
Ser Asp Ala Phe Ala Gly Gln Val Pro Ala Val Pro Val Val Lys Ser
            1075            1080            1085
Asn Tyr Leu Gln Tyr Pro Val Glu Pro Ile Asn Trp Ser Glu Phe Leu
    1090            1095            1100
Pro Pro Pro Pro Glu His Pro Pro Pro Ser Ser Thr Tyr Gly Tyr Ala
1105            1110            1115            1120
Gln Gly Ser Pro Glu Ser Ser Arg Lys Ser Ser Lys Ser Ala Gly Ser
            1125            1130            1135
Gly Ile Ser Thr Asn Gln Ser Ile Leu Asn Ala Ser Ile His Ser Ser
            1140            1145            1150
Ser Ser Gly Gly Phe Ser Ala Trp Gly Val Ser Pro Gln Tyr Ala Val
            1155            1160            1165
Ala Cys Pro Pro Glu Asn Val Tyr Ser Asn Pro Leu Ser Ala Val Ala
    1170            1175            1180
Gly Gly Thr Gln Asn Arg Tyr Gln Ile Thr Pro Thr Asn Gln His Pro
1185            1190            1195            1200
Pro Gln Leu Pro Ala Tyr Phe Ala Thr Thr Gly Pro Gly Gly Ala Val
            1205            1210            1215
Pro Pro Asn His Leu Pro Phe Ala Thr Gln Arg His Ala Ala Ser Glu
            1220            1225            1230
Tyr Gln Ala Gly Leu Asn Ala Ala Arg Cys Ala Gln Ser Arg Ala Cys
            1235            1240            1245
Asn Ser Cys Asp Ala Leu Ala Thr Pro Ser Pro Met Gln Pro Pro Pro
    1250            1255            1260
Pro Val Pro Val Pro Glu Gly Trp Tyr Gln Pro Val His Pro Asn Ser
1265            1270            1275            1280
```

31   64

```
His Pro Met His Pro Thr Ser Ser Asn His Gln Ile Tyr Gln Cys Ser
            1285                1290                1295
Ser Glu Cys Ser Asp His Ser Arg Ser Ser Gln Ser His Lys Arg Gln
            1300                1305                1310
Leu Gln Leu Glu Glu His Gly Ser Ser Ala Lys Gln Arg Gly Gly His
            1315                1320                1325
His Arg Arg Arg Ala Pro Val Val Gln Pro Cys Met Glu Ser Glu Asn
        1330                1335                1340
Glu Asn Met Leu Ala Glu Tyr Glu Gln Arg Gln Tyr Thr Ser Asp Cys
1345                1350                1355                1360
Cys Asn Ser Ser Arg Glu Gly Asp Thr Cys Ser Cys Ser Glu Gly Ser
            1365                1370                1375
Cys Leu Tyr Ala Glu Ala Gly Glu Pro Ala Pro Arg Gln Met Thr Ala
            1380                1385                1390
Lys Asn Thr
        1395
```

<210> 16
<211> 1381
<212> PRT
<213> Drosophila melanogaster

<400> 16

```
Gly Glu Asn Pro Arg Ile Ile Glu His Pro Met Asp Thr Thr Val Pro
1                 5                   10                  15
Lys Asn Asp Pro Phe Thr Phe Asn Cys Gln Ala Glu Gly Asn Pro Thr
            20                  25                  30
Pro Thr Ile Gln Trp Phe Lys Asp Gly Arg Glu Leu Lys Thr Asp Thr
            35                  40                  45
Gly Ser His Arg Ile Met Leu Pro Ala Gly Gly Leu Phe Phe Leu Lys
        50                  55                  60
Val Ile His Ser Arg Arg Glu Ser Asp Ala Gly Thr Tyr Trp Cys Glu
65                  70                  75                  80
Ala Lys Asn Glu Phe Gly Val Ala Arg Ser Arg Asn Ala Thr Leu Gln
                85                  90                  95
Val Ala Val Leu Arg Asp Glu Phe Arg Leu Glu Pro Ala Asn Thr Arg
            100                 105                 110
Val Ala Gln Gly Glu Val Ala Leu Met Glu Cys Gly Ala Pro Arg Gly
            115                 120                 125
Ser Pro Glu Pro Gln Ile Ser Trp Arg Lys Asn Gly Gln Thr Leu Asn
            130                 135                 140
Leu Val Gly Asn Lys Arg Ile Arg Ile Val Asp Gly Gly Asn Leu Ala
145                 150                 155                 160
Ile Gln Glu Ala Arg Gln Ser Asp Asp Gly Arg Tyr Gln Cys Val Val
                165                 170                 175
Lys Asn Val Val Gly Thr Arg Glu Ser Ala Thr Ala Phe Leu Lys Val
            180                 185                 190
His Val Arg Pro Phe Leu Ile Arg Gly Pro Gln Asn Gln Thr Ala Val
            195                 200                 205
Val Gly Ser Ser Val Val Phe Gln Cys Arg Ile Gly Gly Asp Pro Leu
            210                 215                 220
Pro Asp Val Leu Trp Arg Arg Thr Ala Ser Gly Gly Asn Met Pro Leu
225                 230                 235                 240
Arg Lys Phe Ser Trp Leu His Ser Ala Ser Gly Arg Val His Val Leu
```

```
                  245                 250                 255
Glu Asp Arg Ser Leu Lys Leu Asp Asp Val Thr Leu Glu Asp Met Gly
              260                 265                 270
Glu Tyr Thr Cys Glu Ala Asp Asn Ala Val Gly Gly Ile Thr Ala Thr
          275                 280                 285
Gly Ile Leu Thr Val His Ala Pro Pro Lys Phe Val Ile Arg Pro Lys
      290                 295                 300
Asn Gln Leu Val Glu Ile Gly Asp Glu Val Leu Phe Glu Cys Gln Ala
305                 310                 315                 320
Asn Gly His Pro Arg Pro Thr Leu Tyr Trp Ser Val Glu Gly Asn Ser
              325                 330                 335
Ser Leu Leu Leu Pro Gly Tyr Arg Asp Gly Arg Met Glu Val Thr Leu
              340                 345                 350
Thr Pro Glu Gly Arg Ser Val Leu Ser Ile Ala Arg Phe Ala Arg Glu
          355                 360                 365
Asp Ser Gly Lys Val Val Thr Cys Asn Ala Leu Asn Ala Val Gly Ser
      370                 375                 380
Val Ser Ser Arg Thr Val Val Ser Val Asp Thr Gln Phe Glu Leu Pro
385                 390                 395                 400
Pro Pro Ile Ile Glu Gln Gly Pro Val Asn Gln Thr Leu Pro Val Lys
              405                 410                 415
Ser Ile Val Val Leu Pro Cys Arg Thr Leu Gly Thr Pro Val Pro Gln
              420                 425                 430
Val Ser Trp Tyr Leu Asp Gly Ile Pro Ile Asp Val Gln Glu His Glu
              435                 440                 445
Arg Arg Asn Leu Ser Asp Ala Gly Ala Leu Thr Ile Ser Asp Leu Gln
      450                 455                 460
Arg His Glu Asp Glu Gly Leu Tyr Thr Cys Val Ala Ser Asn Arg Asn
465                 470                 475                 480
Gly Lys Ser Ser Trp Ser Gly Tyr Leu Arg Leu Asp Thr Pro Thr Asn
              485                 490                 495
Pro Asn Ile Lys Phe Phe Arg Ala Pro Glu Leu Ser Thr Tyr Pro Gly
              500                 505                 510
Pro Pro Gly Lys Pro Gln Met Val Glu Lys Gly Glu Asn Ser Val Thr
              515                 520                 525
Leu Ser Trp Thr Arg Ser Asn Lys Val Gly Gly Ser Ser Leu Val Gly
              530                 535                 540
Tyr Val Ile Glu Met Phe Gly Lys Asn Glu Thr Asp Gly Trp Val Ala
545                 550                 555                 560
Val Gly Thr Arg Val Gln Asn Thr Thr Phe Thr Gln Thr Gly Leu Leu
              565                 570                 575
Pro Gly Val Asn Tyr Phe Phe Leu Ile Arg Ala Glu Asn Ser His Gly
              580                 585                 590
Leu Ser Leu Pro Ser Pro Met Ser Glu Pro Ile Thr Val Gly Thr Arg
              595                 600                 605
Tyr Phe Asn Ser Gly Leu Asp Leu Ser Glu Ala Arg Ala Ser Leu Leu
      610                 615                 620
Ser Gly Asp Val Val Glu Leu Ser Asn Ala Ser Val Val Asp Ser Thr
625                 630                 635                 640
Ser Met Lys Leu Thr Trp Gln Ile Ile Asn Gly Lys Tyr Val Glu Gly
              645                 650                 655
Phe Tyr Val Tyr Ala Arg Gln Leu Pro Asn Pro Ile Val Asn Asn Pro
              660                 665                 670
Ala Pro Val Thr Ser Asn Thr Asn Pro Leu Leu Gly Ser Thr Ser Thr
```

33   66

Ser Ala Ser Ala Ser Ala Ser Ala Ser Ala Leu Ile Ser Thr Lys Pro
      690   695   700

Asn Ile Ala Ala Ala Gly Lys Arg Asp Gly Glu Thr Asn Gln Ser Gly
705   710   715   720

Gly Gly Ala Pro Thr Pro Leu Asn Thr Lys Tyr Arg Met Leu Thr Ile
          725   730   735

Leu Asn Gly Gly Gly Ala Ser Ser Cys Thr Ile Thr Gly Leu Val Gln
            740   745   750

Tyr Thr Leu Tyr Glu Phe Phe Ile Val Pro Phe Tyr Lys Ser Val Glu
          755   760   765

Gly Lys Pro Ser Asn Ser Arg Ile Ala Arg Thr Leu Glu Asp Val Pro
      770   775   780

Ser Glu Ala Pro Tyr Gly Met Glu Ala Leu Leu Leu Asn Ser Ser Ala
785   790   795   800

Val Phe Leu Lys Trp Lys Ala Pro Glu Leu Lys Asp Arg His Gly Val
          805   810   815

Leu Leu Asn Tyr His Val Ile Val Arg Gly Ile Asp Thr Ala His Asn
          820   825   830

Phe Ser Arg Ile Leu Thr Asn Val Thr Ile Asp Ala Ala Ser Pro Thr
          835   840   845

Leu Val Leu Ala Asn Leu Thr Glu Gly Val Met Tyr Thr Val Gly Val
      850   855   860

Ala Ala Gly Asn Asn Ala Gly Val Gly Pro Tyr Cys Val Pro Ala Thr
865   870   875   880

Leu Arg Leu Asp Pro Ile Thr Lys Arg Leu Asp Pro Phe Ile Asn Gln
          885   890   895

Arg Asp His Val Asn Asp Val Leu Thr Gln Pro Trp Phe Ile Ile Leu
          900   905   910

Leu Gly Ala Ile Leu Ala Val Leu Met Leu Ser Phe Gly Ala Met Val
          915   920   925

Phe Val Lys Arg Lys His Met Met Met Lys Gln Ser Ala Leu Asn Thr
      930   935   940

Met Arg Gly Asn His Thr Ser Asp Val Leu Lys Met Pro Ser Leu Ser
945   950   955   960

Ala Arg Asn Gly Asn Gly Tyr Trp Leu Asp Ser Ser Thr Gly Gly Met
          965   970   975

Val Trp Arg Pro Ser Pro Gly Gly Asp Ser Leu Glu Met Gln Lys Asp
          980   985   990

His Ile Ala Asp Tyr Ala Pro Val Cys Gly Ala Pro Gly Ser Pro Ala
          995   1000   1005

Gly Gly Gly Thr Ser Ser Gly Gly Ser Gly Gly Ala Gly Ser Gly Ala
      1010   1015   1020

Ser Gly Gly Asp Asp Ile His Gly Gly His Gly Ser Glu Arg Asn Gln
1025   1030   1035   1040

Gln Arg Tyr Val Gly Glu Tyr Ser Asn Ile Pro Thr Asp Tyr Ala Glu
          1045   1050   1055

Val Ser Ser Phe Gly Lys Ala Pro Ser Glu Tyr Gly Arg His Gly Asn
          1060   1065   1070

Ala Ser Pro Ala Pro Tyr Ala Thr Ser Ser Ile Leu Ser Pro His Gln
          1075   1080   1085

Gln Gln Gln Gln Gln Gln Pro Arg Tyr Gln Gln Arg Pro Val Pro Gly
      1090   1095   1100

Tyr Gly Leu Gln Arg Pro Met His Pro His Tyr Gln Gln Gln Gln His

```
                1105                    1110                    1115                    1120
Gln Gln Gln Gln Ala Gln Gln Thr His Gln Gln His Gln Ala Leu Gln
                          1125                    1130                    1135
Gln His Gln Gln Leu Pro Pro Ser Asn Ile Tyr Gln Gln Met Ser Thr
                    1140                    1145                    1150
Thr Ser Glu Ile Tyr Pro Thr Asn Thr Gly Pro Ser Arg Ser Val Tyr
                    1155                    1160                    1165
Ser Glu Gln Tyr Tyr Tyr Pro Lys Asp Lys Gln Arg His Ile His Ile
                    1170                    1175                    1180
Thr Glu Asn Lys Leu Ser Asn Cys His Thr Tyr Glu Ala Ala Pro Gly
1185                    1190                    1195                    1200
Ala Lys Gln Ser Ser Pro Ile Ser Ser Gln Phe Ala Ser Val Arg Arg
                          1205                    1210                    1215
Gln Gln Leu Pro Pro Asn Cys Ser Ile Gly Arg Glu Ser Ala Arg Phe
                    1220                    1225                    1230
Lys Val Leu Asn Thr Asp Gln Gly Lys Asn Gln Gln Asn Leu Leu Asp
          1235                    1240                    1245
Leu Asp Gly Ser Ser Met Cys Tyr Asn Gly Leu Ala Asp Ser Gly Cys
          1250                    1255                    1260
Gly Gly Ser Pro Ser Pro Met Ala Met Leu Met Ser His Glu Asp Glu
1265                    1270                    1275                    1280
His Ala Leu Tyr His Thr Ala Asp Gly Asp Leu Asp Asp Met Glu Arg
                    1285                    1290                    1295
Leu Tyr Val Lys Val Asp Glu Gln Gln Pro Pro Gln Gln Gln Gln Gln
                    1300                    1305                    1310
Leu Ile Pro Leu Val Pro Gln His Pro Ala Glu Gly His Leu Gln Ser
          1315                    1320                    1325
Trp Arg Asn Gln Ser Thr Arg Ser Ser Arg Lys Asn Gly Gln Glu Cys
          1330                    1335                    1340
Ile Lys Glu Pro Ser Glu Leu Ile Tyr Ala Pro Gly Ser Val Ala Ser
1345                    1350                    1355                    1360
Glu Arg Ser Leu Leu Ser Asn Ser Gly Ser Gly Thr Ser Ser Gln Pro
                    1365                    1370                    1375
Ala Gly His Asn Val
          1380


<210> 17
<211> 1297
<212> PRT
<213> Caenorhabditis elegans


<400> 17
Met Tyr Tyr Leu Gly Phe Tyr His Thr His Thr His Thr His Thr Tyr
1                   5                   10                  15
Ile Asn Phe Asp Lys Ile Pro Asn Ala Ser Asn Leu Ala Pro Val Ile
              20                  25                  30
Ile Glu His Pro Ile Asp Val Val Val Ser Arg Gly Ser Pro Ala Thr
          35                  40                  45
Leu Asn Cys Gly Ala Lys Pro Ser Thr Ala Lys Ile Thr Trp Tyr Lys
      50                  55                  60
Asp Gly Gln Pro Val Ile Thr Asn Lys Glu Gln Val Asn Ser His Arg
65                  70                  75                  80
Ile Val Leu Asp Thr Gly Ser Leu Phe Leu Leu Lys Val Asn Ser Gly
                  85                  90                  95
```

```
Lys Asn Gly Lys Asp Ser Asp Ala Gly Ala Tyr Tyr Cys Val Ala Ser
            100                 105                 110
Asn Glu His Gly Glu Val Lys Ser Asn Glu Gly Ser Leu Lys Leu Ala
            115                 120                 125
Met Leu Arg Glu Asp Phe Arg Val Arg Pro Arg Thr Val Gln Ala Leu
    130                 135                 140
Gly Gly Glu Met Ala Val Leu Glu Cys Ser Pro Pro Arg Gly Phe Pro
145                 150                 155                 160
Glu Pro Val Val Ser Trp Arg Lys Asp Asp Lys Glu Leu Arg Ile Gln
                165                 170                 175
Asp Met Pro Arg Tyr Thr Leu His Ser Asp Gly Asn Leu Ile Ile Asp
            180                 185                 190
Pro Val Asp Arg Ser Asp Ser Gly Thr Tyr Gln Cys Val Ala Asn Asn
            195                 200                 205
Met Val Gly Glu Arg Val Ser Asn Pro Ala Arg Leu Ser Val Phe Glu
    210                 215                 220
Lys Pro Lys Phe Glu Gln Glu Pro Lys Asp Met Thr Val Asp Val Gly
225                 230           .     235                 240
Ala Ala Val Leu Phe Asp Cys Arg Val Thr Gly Asp Pro Gln Pro Gln
                245                 250                 255
Ile Thr Trp Lys Arg Lys Asn Glu Pro Met Pro Val Thr Arg Ala Tyr
            260                 265                 270
Ile Ala Lys Asp Asn Arg Gly Leu Arg Ile Glu Arg Val Gln Pro Ser
            275                 280                 285
Asp Glu Gly Glu Tyr Val Cys Tyr Ala Arg Asn Pro Ala Gly Thr Leu
    290                 295                 300
Glu Ala Ser Ala His Leu Arg Val Gln Ala Pro Pro Ser Phe Gln Thr
305                 310                 315            .     320
Lys Pro Ala Asp Gln Ser Val Pro Ala Gly Gly Thr Ala Thr Phe Glu
            325                 330                 335
Cys Thr Leu Val Gly Gln Pro Ser Pro Ala Tyr Phe Trp Ser Lys Glu
            340                 345                 350
Gly Gln Gln Asp Leu Leu Phe Pro Ser Tyr Val Ser Ala Asp Gly Arg
            355                 360                 365
Thr Lys Val Ser Pro Thr Gly Thr Leu Thr Ile Glu Glu Val Arg Gln
    370                 375                 380
Val Asp Glu Gly Ala Tyr Val Cys Ala Gly Met Asn Ser Ala Gly Ser
385                 390                 395                 400
Ser Leu Ser Lys Ala Ala Leu Lys Ala Thr Phe Glu Thr Lys Gly Arg
            405                 410                 415
Val Gln Lys Lys Lys Ser Lys Met Gly Lys Gln Lys Gln Lys Asn Val
            420                 425                 430
Gln Ser Ile Ile Lys Tyr Leu Ile Ser Ala Val Thr Gly Asn Thr Pro
            435                 440                 445
Ala Lys Pro Pro Pro Thr Ile Glu His Gly His Gln Asn Gln Thr Leu
    450                 455                 460
Met Val Gly Ser Ser Ala Ile Leu Pro Cys Gln Ala Ser Gly Lys Pro
465                 470                 475                 480
Thr Pro Gly Ile Ser Trp Leu Arg Asp Gly Leu Pro Ile Asp Ile Thr
                485                 490                 495
Asp Ser Arg Ile Ser Gln His Ser Thr Gly Ser Leu His Ile Ala Asp
            500                 505                 510
Leu Lys Lys Pro Asp Thr Gly Val Tyr Thr Cys Ile Ala Lys Asn Glu
            515                 520                 525
```

Asp Gly Glu Ser Thr Trp Ser Ala Ser Leu Thr Val Glu Asp His Thr
530   535   540
Ser Asn Ala Gln Phe Val Arg Met Pro Asp Pro Ser Asn Phe Pro Ser
545   550   555   560
Ser Pro Thr Gln Pro Ile Ile Val Asn Val Thr Asp Thr Glu Val Glu
                565   570   575
Leu His Trp Asn Ala Pro Ser Thr Ser Gly Ala Gly Pro Ile Thr Gly
                580   585   590
Tyr Ile Ile Gln Tyr Tyr Ser Pro Asp Leu Gly Gln Thr Trp Phe Asn
        595   600   605
Ile Pro Asp Tyr Val Ala Ser Thr Glu Tyr Arg Ile Lys Gly Leu Lys
        610   615   620
Pro Ser His Ser Tyr Met Phe Val Ile Arg Ala Glu Asn Glu Lys Gly
625   630   635   640
Ile Gly Thr Pro Ser Val Ser Ser Ala Leu Val Thr Thr Ser Lys Pro
                645   650   655
Ala Ala Gln Val Ala Leu Ser Asp Lys Asn Lys Met Asp Met Ala Ile
                660   665   670
Ala Glu Lys Arg Leu Thr Ser Glu Gln Leu Ile Lys Leu Glu Glu Val
        675   680   685
Lys Thr Ile Asn Ser Thr Ala Val Arg Leu Phe Trp Lys Lys Arg Lys
        690   695   700
Leu Glu Glu Leu Ile Asp Gly Tyr Tyr Ile Lys Trp Arg Gly Pro Pro
705   710   715   720
Arg Thr Asn Asp Asn Gln Tyr Val Asn Val Thr Ser Pro Ser Thr Glu
                725   730   735
Asn Tyr Val Val Ser Asn Leu Met Pro Phe Thr Asn Tyr Glu Phe Phe
                740   745   750
Val Ile Pro Tyr His Ser Gly Val His Ser Ile His Gly Ala Pro Ser
        755   760   765
Asn Ser Met Asp Val Leu Thr Ala Glu Ala Pro Pro Ser Leu Pro Pro
        770   775   780
Glu Asp Val Arg Ile Arg Met Leu Asn Leu Thr Thr Leu Arg Ile Ser
785   790   795   800
Trp Lys Ala Pro Lys Ala Asp Gly Ile Asn Gly Ile Leu Lys Gly Phe
                805   810   815
Gln Ile Val Ile Val Gly Gln Ala Pro Asn Asn Asn Arg Asn Ile Thr
                820   825   830
Thr Asn Glu Arg Ala Ala Ser Val Thr Leu Phe His Leu Val Thr Gly
        835   840   845
Met Thr Tyr Lys Ile Arg Val Ala Ala Arg Ser Asn Gly Gly Val Gly
        850   855   860
Val Ser His Gly Thr Ser Glu Val Ile Met Asn Gln Asp Thr Leu Glu
865   870   875   880
Lys His Leu Ala Ala Gln Gln Glu Asn Glu Ser Phe Leu Tyr Gly Leu
                885   890   895
Ile Asn Lys Ser His Val Pro Val Ile Val Ile Val Ala Ile Leu Ile
                900   905   910
Ile Phe Val Val Ile Ile Ile Ala Tyr Cys Tyr Trp Arg Asn Ser Arg
        915   920   925
Asn Ser Asp Gly Lys Asp Arg Ser Phe Ile Lys Ile Asn Asp Gly Ser
        930   935   940
Val His Met Ala Ser Asn Asn Leu Trp Asp Val Ala Gln Asn Pro Asn
945   950   955   960

37   70

```
Gln Asn Pro Met Tyr Asn Thr Ala Gly Arg Met Thr Met Asn Asn Arg
                965                 970                 975
Asn Gly Gln Ala Leu Tyr Ser Leu Thr Pro Asn Ala Gln Asp Phe Phe
                980                 985                 990
Asn Asn Cys Asp Asp Tyr Ser Gly Thr Met His Arg Pro Gly Ser Glu
                995                 1000                1005
His His Tyr His Tyr Ala Gln Leu Thr Gly Gly Pro Gly Asn Ala Met
                1010                1015                1020
Ser Thr Phe Tyr Gly Asn Gln Tyr His Asp Asp Pro Ser Pro Tyr Ala
1025                1030                1035                1040
Thr Thr Thr Leu Val Leu Ser Asn Gln Gln Pro Ala Trp Leu Asn Asp
                1045                1050                1055
Lys Met Leu Arg Ala Pro Ala Met Pro Thr Asn Pro Val Pro Pro Glu
                1060                1065                1070
Pro Pro Ala Arg Tyr Ala Asp His Thr Ala Gly Arg Arg Ser Arg Ser
                1075                1080                1085
Ser Arg Ala Ser Asp Gly Arg Gly Thr Leu Asn Gly Gly Leu His His
                1090                1095                1100
Arg Thr Ser Gly Ser Gln Arg Ser Asp Ser Pro Pro His Thr Asp Val
1105                1110                1115                1120
Ser Tyr Val Gln Leu His Ser Ser Asp Gly Thr Gly Ser Ser Lys Glu
                1125                1130                1135
Arg Thr Gly Glu Arg Arg Thr Pro Pro Asn Lys Thr Leu Met Asp Phe
                1140                1145                1150
Ile Pro Pro Pro Pro Ser Asn Pro Pro Pro Gly Gly His Val Tyr
                1155                1160                1165
Asp Thr Ala Thr Arg Arg Gln Leu Asn Arg Gly Ser Thr Pro Arg Glu
                1170                1175                1180
Asp Thr Tyr Asp Ser Val Ser Asp Gly Ala Phe Ala Arg Val Asp Val
1185                1190                1195                1200
Asn Ala Arg Pro Thr Ser Arg Asn Arg Asn Leu Gly Gly Arg Pro Leu
                1205                1210                1215
Lys Gly Lys Arg Asp Asp Asp Ser Gln Arg Ser Ser Leu Met Met Asp
                1220                1225                1230
Asp Asp Gly Gly Ser Ser Glu Ala Asp Gly Glu Asn Ser Glu Gly Asp
                1235                1240                1245
Val Pro Arg Gly Gly Val Arg Lys Ala Val Pro Arg Met Gly Ile Ser
1250                1255                1260
Ala Ser Thr Leu Ala His Ser Cys Tyr Gly Thr Asn Gly Thr Ala Gln
1265                1270                1275                1280
Arg Phe Arg Ser Ile Pro Arg Asn Asn Gly Ile Val Thr Gln Glu Gln
                1285                1290                1295
Thr
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<210> 18
<211> 1651
<212> PRT
<213> human

<400> 18
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Met Lys Trp Lys His Val Pro Phe Leu Val Met Ile Ser Leu Leu Ser
1               5                   10                  15
Leu Ser Pro Asn His Leu Phe Leu Ala Gln Leu Ile Pro Asp Pro Glu
                20                  25                  30
```

```
Asp Val Glu Arg Gly Asn Asp His Gly Thr Pro Ile Pro Thr Ser Asp
        35              40              45
Asn Asp Asp Asn Ser Leu Gly Tyr Thr Gly Ser Arg Leu Arg Gln Glu
    50              55              60
Asp Phe Pro Pro Arg Ile Val Glu His Pro Ser Asp Leu Ile Val Ser
65              70              75              80
Lys Gly Glu Pro Ala Thr Leu Asn Cys Lys Ala Glu Gly Arg Pro Thr
                85              90              95
Pro Thr Ile Glu Trp Tyr Lys Gly Gly Glu Arg Val Glu Thr Asp Lys
            100             105             110
Asp Asp Pro Arg Ser His Arg Met Leu Leu Pro Ser Gly Ser Leu Phe
    115             120             125
Phe Leu Arg Ile Val His Gly Arg Lys Ser Arg Pro Asp Glu Gly Val
    130             135             140
Tyr Val Cys Val Ala Arg Asn Tyr Leu Gly Glu Ala Val Ser His Asn
145             150             155             160
Ala Ser Leu Glu Val Ala Ile Leu Arg Asp Asp Phe Arg Gln Asn Pro
            165             170             175
Ser Asp Val Met Val Ala Val Gly Glu Pro Ala Val Met Glu Cys Gln
            180             185             190
Pro Pro Arg Gly His Pro Glu Pro Thr Ile Ser Trp Lys Lys Asp Gly
        195             200             205
Ser Pro Leu Asp Asp Lys Asp Glu Arg Ile Thr Ile Arg Gly Gly Lys
    210             215             220
Leu Met Ile Thr Tyr Thr Arg Lys Ser Asp Ala Gly Lys Tyr Val Cys
225             230             235             240
Val Gly Thr Asn Met Val Gly Glu Arg Glu Ser Glu Val Ala Glu Leu
            245             250             255
Thr Val Leu Glu Arg Pro Ser Phe Val Lys Arg Pro Ser Asn Leu Ala
            260             265             270
Val Thr Val Asp Asp Ser Ala Glu Phe Lys Cys Glu Ala Arg Gly Asp
        275             280             285
Pro Val Pro Thr Val Arg Trp Arg Lys Asp Asp Gly Glu Leu Pro Lys
    290             295             300
Ser Arg Tyr Glu Ile Arg Asp Asp His Thr Leu Lys Ile Arg Lys Val
305             310             315             320
Thr Ala Gly Asp Met Gly Ser Tyr Thr Cys Val Ala Glu Asn Met Val
            325             330             335
Gly Lys Ala Glu Ala Ser Ala Thr Leu Thr Val Gln Glu Pro Pro His
            340             345             350
Phe Val Val Lys Pro Arg Asp Gln Val Val Ala Leu Gly Arg Thr Val
            355             360             365
Thr Phe Gln Cys Glu Ala Thr Gly Asn Pro Gln Pro Ala Ile Phe Trp
    370             375             380
Arg Arg Glu Gly Ser Gln Asn Leu Leu Phe Ser Tyr Gln Pro Pro Gln
385             390             395             400
Ser Ser Ser Arg Phe Ser Val Ser Gln Thr Gly Asp Leu Thr Ile Thr
            405             410             415
Asn Val Gln Arg Ser Asp Val Gly Tyr Tyr Ile Cys Gln Thr Leu Asn
            420             425             430
Val Ala Gly Ser Ile Ile Thr Lys Ala Tyr Leu Glu Val Thr Asp Val
    435             440             445
Ile Ala Asp Arg Pro Pro Pro Val Ile Arg Gln Gly Pro Val Asn Gln
    450             455             460
```

```
Thr Val Ala Val Asp Gly Thr Phe Val Leu Ser Cys Val Ala Thr Gly
465             470             475             480
Ser Pro Val Pro Thr Ile Leu Trp Arg Lys Asp Gly Val Leu Val Ser
            485             490             495
Thr Gln Asp Ser Arg Ile Lys Gln Leu Glu Asn Gly Val Leu Gln Ile
            500             505             510
Arg Tyr Ala Lys Leu Gly Asp Thr Gly Arg Tyr Thr Cys Ile Ala Ser
            515             520             525
Thr Pro Ser Gly Glu Ala Thr Trp Ser Ala Tyr Ile Glu Val Gln Glu
            530             535             540
Phe Gly Val Pro Val Gln Pro Pro Arg Pro Thr Asp Pro Asn Leu Ile
545             550             555             560
Pro Ser Ala Pro Ser Lys Pro Glu Val Thr Asp Val Ser Arg Asn Thr
                565             570             575
Val Thr Leu Ser Trp Gln Pro Asn Leu Asn Ser Gly Ala Thr Pro Thr
            580             585             590
Ser Tyr Ile Ile Glu Ala Phe Ser His Ala Ser Gly Ser Ser Trp Gln
            595             600             605
Thr Val Ala Glu Asn Val Lys Thr Glu Thr Ser Ala Ile Lys Gly Leu
            610             615             620
Lys Pro Asn Ala Ile Tyr Leu Phe Leu Val Arg Ala Ala Asn Ala Tyr
625             630             635             640
Gly Ile Ser Asp Pro Ser Gln Ile Ser Asp Pro Val Lys Thr Gln Asp
                645             650             655
Val Leu Pro Thr Ser Gln Gly Val Asp His Lys Gln Val Gln Arg Glu
                660             665             670
Leu Gly Asn Ala Val Leu His Leu His Asn Pro Thr Val Leu Ser Ser
            675             680             685
Ser Ser Ile Glu Val His Trp Thr Val Asp Gln Gln Ser Gln Tyr Ile
    690             695             700
Gln Gly Tyr Lys Ile Leu Tyr Arg Pro Ser Gly Ala Asn His Gly Glu
705             710             715             720
Ser Asp Trp Leu Val Phe Glu Val Arg Thr Pro Ala Lys Asn Ser Val
            725             730             735
Val Ile Pro Asp Leu Arg Lys Gly Val Asn Tyr Glu Ile Lys Ala Arg
            740             745             750
Pro Phe Phe Asn Glu Phe Gln Gly Ala Asp Ser Glu Ile Lys Phe Ala
    755             760             765
Lys Thr Leu Glu Glu Ala Pro Ser Ala Pro Pro Gln Gly Val Thr Val
770             775             780
Ser Lys Asn Asp Gly Asn Gly Thr Ala Ile Leu Val Ser Trp Gln Pro
785             790             795             800
Pro Pro Glu Asp Thr Gln Asn Gly Met Val Gln Glu Tyr Lys Val Trp
            805             810             815
Cys Leu Gly Asn Glu Thr Arg Tyr His Ile Asn Lys Thr Val Asp Gly
            820             825             830
Ser Thr Phe Ser Val Val Ile Pro Phe Leu Val Pro Gly Ile Arg Tyr
            835             840             845
Ser Val Glu Val Ala Ala Ser Thr Gly Ala Gly Ser Gly Val Lys Ser
850             855             860
Glu Pro Gln Phe Ile Gln Leu Asp Ala His Gly Asn Pro Val Ser Pro
865             870             875             880
Glu Asp Gln Val Ser Leu Ala Gln Gln Ile Ser Asp Val Val Lys Gln
            885             890             895
```

Pro Ala Phe Ile Ala Gly Ile Gly Ala Ala Cys Trp Ile Ile Leu Met
            900   905   910
Val Phe Ser Ile Trp Leu Tyr Arg His Arg Lys Lys Arg Asn Gly Leu
            915   920   925
Thr Ser Thr Tyr Ala Gly Ile Arg Lys Val Pro Ser Phe Thr Phe Thr
            930   935   940
Pro Thr Val Thr Tyr Gln Arg Gly Gly Glu Ala Val Ser Ser Gly Gly
945   950   955   960
Arg Pro Gly Leu Leu Asn Ile Ser Glu Pro Ala Ala Gln Pro Trp Leu
                965   970   975
Ala Asp Thr Trp Pro Asn Thr Gly Asn Asn His Asn Asp Cys Ser Ile
            980   985   990
Ser Cys Cys Thr Ala Gly Asn Gly Asn Ser Asp Ser Asn Leu Thr Thr
            995   1000   1005
Tyr Ser Arg Pro Ala Asp Cys Ile Ala Asn Tyr Asn Asn Gln Leu Asp
    1010   1015   1020
Asn Lys Gln Thr Asn Leu Met Leu Pro Glu Ser Thr Val Tyr Gly Asp
1025   1030   1035   1040
Val Asp Leu Ser Asn Lys Ile Asn Glu Met Lys Thr Phe Asn Ser Pro
            1045   1050   1055
Asn Leu Lys Asp Gly Arg Phe Val Asn Pro Ser Gly Gln Pro Thr Pro
            1060   1065   1070
Tyr Ala Thr Thr Gln Leu Ile Gln Ser Asn Leu Ser Asn Asn Met Asn
            1075   1080   1085
Asn Gly Ser Gly Asp Ser Gly Glu Lys His Trp Lys Pro Leu Gly Gln
            1090   1095   1100
Gln Lys Gln Glu Val Ala Pro Val Gln Tyr Asn Ile Val Glu Gln Asn
1105   1110   1115   1120
Lys Leu Asn Lys Asp Tyr Arg Ala Asn Asp Thr Val Pro Pro Thr Ile
            1125   1130   1135
Pro Tyr Asn Gln Ser Tyr Asp Gln Asn Thr Gly Gly Ser Tyr Asn Ser
            1140   1145   1150
Ser Asp Arg Gly Ser Ser Thr Ser Gly Ser Gln Gly His Lys Lys Gly
            1155   1160   1165
Ala Arg Thr Pro Lys Val Pro Lys Gln Gly Gly Met Asn Trp Ala Asp
            1170   1175   1180
Leu Leu Pro Pro Pro Pro Ala His Pro Pro Pro His Ser Asn Ser Glu
1185   1190   1195   1200
Glu Tyr Asn Ile Ser Val Asp Glu Ser Tyr Asp Gln Glu Met Pro Cys
            1205   1210   1215
Pro Val Pro Pro Ala Arg Met Tyr Leu Gln Gln Asp Glu Leu Glu Glu
            1220   1225   1230
Glu Glu Asp Glu Arg Gly Pro Thr Pro Pro Val Arg Gly Ala Ala Ser
            1235   1240   1245
Ser Pro Ala Ala Val Ser Tyr Ser His Gln Ser Thr Ala Thr Leu Thr
            1250   1255   1260
Pro Ser Pro Gln Glu Glu Leu Gln Pro Met Leu Gln Asp Cys Pro Glu
1265   1270   1275   1280
Glu Thr Gly His Met Gln His Gln Pro Asp Arg Arg Arg Gln Pro Val
            1285   1290   1295
Ser Pro Pro Pro Pro Arg Pro Ile Ser Pro Pro His Thr Tyr Gly
            1300   1305   1310
Tyr Ile Ser Gly Pro Leu Val Ser Asp Met Asp Thr Asp Ala Pro Glu
            1315   1320   1325

41   74

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        Glu Glu Glu Asp Glu Ala Asp Met Glu Val Ala Lys Met Gln Thr Arg
            1330                1335                1340
        Arg Leu Leu Leu Arg Gly Leu Glu Gln Thr Pro Ala Ser Ser Val Gly
        1345                1350                1355                1360
        Asp Leu Glu Ser Ser Val Thr Gly Ser Met Ile Asn Gly Trp Gly Ser
                        1365                1370                1375
        Ala Ser Glu Glu Asp Asn Ile Ser Ser Gly Arg Ser Ser Val Ser Ser
                    1380                1385                1390
        Ser Asp Gly Ser Phe Phe Thr Asp Ala Asp Phe Ala Gln Ala Val Ala
                1395                1400                1405
        Ala Ala Ala Glu Tyr Ala Gly Leu Lys Val Ala Arg Arg Gln Met Gln
            1410                1415                1420
        Asp Ala Ala Gly Arg Arg His Phe His Ala Ser Gln Cys Pro Arg Pro
        1425                1430                1435                1440
        Thr Ser Pro Val Ser Thr Asp Ser Asn Met Ser Ala Ala Val Met Gln
                    1445                1450                1455
        Lys Thr Arg Pro Ala Lys Lys Leu Lys His Gln Pro Gly His Leu Arg
                    1460                1465                1470
        Arg Glu Thr Tyr Thr Asp Asp Leu Pro Pro Pro Pro Val Pro Pro Pro
                    1475                1480                1485
        Ala Ile Lys Ser Pro Thr Ala Gln Ser Lys Thr Gln Leu Glu Val Arg
                1490                1495                1500
        Pro Val Val Val Pro Lys Leu Pro Ser Met Asp Ala Arg Thr Asp Arg
        1505                1510                1515                1520
        Ser Ser Asp Arg Lys Gly Ser Ser Tyr Lys Gly Arg Glu Val Leu Asp
                        1525                1530                1535
        Gly Arg Gln Val Val Asp Met Arg Thr Asn Pro Gly Asp Pro Arg Glu
                    1540                1545                1550
        Ala Gln Glu Gln Gln Asn Asp Gly Lys Gly Arg Gly Asn Lys Ala Ala
                    1555                1560                1565
        Lys Arg Asp Leu Pro Pro Ala Lys Thr His Leu Ile Gln Glu Asp Ile
            1570                1575                1580
        Leu Pro Tyr Cys Arg Pro Thr Phe Pro Thr Ser Asn Asn Pro Arg Asp
        1585                1590                1595                1600
        Pro Ser Ser Ser Ser Ser Met Ser Ser Arg Gly Ser Gly Ser Arg Gln
                        1605                1610                1615
        Arg Glu Gln Ala Asn Val Gly Arg Arg Asn Ile Ala Glu Met Gln Val
                    1620                1625                1630
        Leu Gly Gly Tyr Glu Arg Gly Glu Asp Asn Asn Glu Glu Leu Glu Glu
                1635                1640                1645
        Thr Glu Ser
            1650


<210> 19
<211> 434
<212> PRT
<213> human

<220>
<221> misc_feature
<222> (285)..(396)
<223> note="Xaa signifies gap in sequence"

<400> 19
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Gln Ile Val Ala Gln Gly Arg Thr Val Thr Phe Pro Cys Glu Thr Lys
1               5                   10                  15
Gly Asn Pro Gln Pro Ala Val Phe Trp Gln Lys Glu Gly Ser Gln Asn
            20                  25                  30
Leu Leu Phe Pro Asn Gln Pro Gln Gln Pro Asn Ser Arg Cys Ser Val
            35                  40                  45
Ser Pro Thr Gly Asp Leu Thr Ile Thr Asn Ile Gln Arg Ser Asp Ala
    50                  55                  60
Gly Tyr Tyr Ile Cys Gln Ala Leu Thr Val Ala Gly Ser Ile Leu Ala
65              70                  75                      80
Lys Ala Gln Leu Glu Val Thr Asp Val Leu Thr Asp Arg Pro Pro Pro
            85                  90                  95
Ile Ile Leu Gln Gly Pro Ala Asn Gln Thr Leu Ala Val Asp Gly Thr
            100                 105                 110
Ala Leu Leu Lys Cys Lys Ala Thr Gly Asp Pro Leu Pro Val Ile Ser
            115                 120                 125
Trp Leu Lys Glu Gly Phe Thr Phe Pro Gly Arg Asp Pro Arg Ala Thr
    130                 135                 140
Ile Gln Glu Gln Gly Thr Leu Gln Ile Lys Asn Leu Arg Ile Ser Asp
145                 150                 155                 160
Thr Gly Thr Tyr Thr Cys Val Ala Thr Ser Ser Ser Gly Glu Ala Ser
                165                 170                 175
Trp Ser Ala Val Leu Asp Val Thr Glu Ser Gly Ala Thr Ile Ser Lys
                180                 185                 190
Asn Tyr Asp Leu Ser Asp Leu Pro Gly Pro Pro Ser Lys Pro Gln Val
                195                 200                 205
Thr Asp Val Thr Lys Asn Ser Val Thr Leu Ser Trp Gln Pro Gly Thr
210                 215                 220
Pro Gly Thr Leu Pro Ala Ser Ala Tyr Ile Ile Glu Ala Phe Ser Gln
225                 230                 235                 240
Ser Val Ser Asn Ser Trp Gln Thr Val Ala Asn His Val Lys Thr Thr
                245                 250                 255
Leu Tyr Thr Val Arg Gly Leu Arg Pro Asn Thr Ile Tyr Leu Phe Met
                260                 265                 270
Val Arg Ala Ile Asn Pro Lys Val Ser Val Thr Gln Xaa Lys Pro Gln
    275                 280                 285
Lys Asn Asn Gly Ser Thr Trp Ala Asn Val Pro Leu Pro Pro Pro Pro
    290                 295                 300
Val Gln Pro Leu Pro Gly Thr Glu Leu Glu His Tyr Ala Val Glu Gln
305                 310                 315                 320
Gln Glu Asn Gly Tyr Asp Ser Asp Ser Trp Cys Pro Pro Leu Pro Val
                325                 330                 335
Gln Thr Tyr Leu His Gln Gly Leu Glu Asp Glu Leu Glu Glu Asp Asp
                340                 345                 350
Asp Arg Val Pro Thr Pro Pro Val Arg Gly Val Ala Ser Ser Pro Ala
            355                 360                 365
Ile Ser Phe Gly Gln Gln Ser Thr Ala Thr Leu Thr Pro Ser Pro Arg
    370                 375                 380
Glu Glu Met Gln Pro Met Leu Gln Ala Ser Pro Xaa Phe Thr Ser Ser
385                 390                 395                 400
Gln Arg Pro Arg Pro Thr Ser Pro Phe Ser Thr Asp Ser Asn Thr Ser
            405                 410                 415
Ala Ala Leu Ser Gln Ser Gln Arg Pro Arg Pro Thr Lys Lys His Lys
```

Gly Gly

<210> 20
<211> 148
<212> PRT
<213> mouse

<400> 20

```
Ala Gln Ala Val Ala Ala Ala Ala Glu Tyr Ala Gly Leu Lys Val Ala
1               5                   10                  15
Arg Arg Gln Met Gln Asp Ala Ala Gly Arg Arg His Phe His Ala Ser
            20                  25                  30
Gln Cys Pro Arg Pro Thr Ser Pro Val Ser Thr Asp Ser Asn Met Ser
            35                  40                  45
Ala Val Val Ile Gln Lys Ala Arg Pro Ala Lys Lys Gln Lys His Gln
        50                  55                  60
Pro Gly His Leu Arg Arg Glu Ala Tyr Ala Asp Asp Leu Pro Pro Pro
65                  70                  75                  80
Pro Val Pro Pro Pro Ala Ile Lys Ser Pro Thr Val Gln Ser Lys Ala
                85                  90                  95
Gln Leu Glu Val Arg Pro Val Met Val Pro Lys Leu Ala Ser Ile Glu
            100                 105                 110
Ala Arg Thr Asp Arg Ser Ser Asp Arg Lys Gly Gly Ser Tyr Lys Gly
            115                 120                 125
Arg Glu Ala Leu Asp Gly Arg Gln Val Thr Asp Leu Arg Thr Asn Pro
            130                 135                 140
Ser Asp Pro Arg
145
```